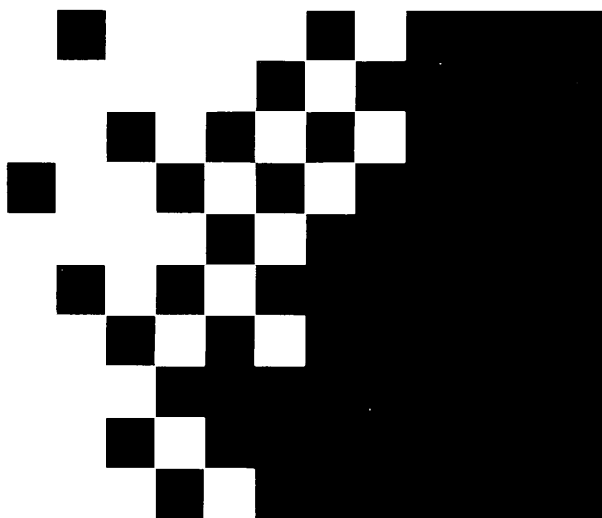


AST Premium[®]/386C

User's Manual

AST
RESEARCH INC.



—AST—
Premium
—ENTER PRICES—

FCC WARNING

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to a computer that complies with Class B limits. Operation with non-certified peripherals is likely to result in interference to radio and TV reception. When connecting to a peripheral device, a shielded I/O cable is required to ensure compliance with FCC rules.

Instructions to User

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and TV reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

- Ensure that board slot covers are in place when no board is installed.
- Ensure that all brackets are fastened securely to the PC chassis.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission (FCC) helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.

AST Premium®/386C

**High-Performance,
Advanced-Architecture
IBM®PC AT®-Compatible
Computer**

**User's Manual
000842-001 A
November 1988**

First edition (November 1988)

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INTRODUCING AST PREMIUM/386C

AST Premium®/386C is a desktop microcomputer system with an 80386 microprocessor and high-speed cache memory architecture. Designed for users with high-performance and multitasking requirements, Premium/386C provides the power and speed needed to run complex spreadsheet, computer aided design, network, scientific, and desktop publishing programs. Premium/386C features include:

- 80386 microprocessor running at a speed of 20 megahertz (MHz), switchable to IBM® AT® (8 MHz) and IBM PC (4.77 MHz) speeds.
- Cache memory architecture with 64 kilobytes (KB) of fast-access 25-nanosecond (ns) static random access memory (RAM). Memory caching improves the performance of central processing unit (CPU)-intensive applications by placing frequently used code and data into very fast, zero-wait-state memory. In addition, memory caching also improves performance of disk-intensive applications using the disk cache.
- AST SMARTslot™ Architecture. An extended PC AT bus design that offers high-performance multimaster capability while maintaining AT compatibility.
- Four 8/16-bit interface slots and two 8-bit interface slots. The slots are compatible with both PC XT™ and AT option boards.

- One 32-bit interface slot dedicated to the Premium/386C memory board
- Floppy controller on system board that can support three floppy devices with AST utility software
- Support for 80387 math coprocessor chip running at 20 MHz
- Two serial ports and one parallel port built into the system board support multiple peripherals without using an expansion slot
- Software-controlled configuration of built-in ports, no jumpers or switches
- AST menu software that provides easy access to setup and utility software
- 1-2 megabytes (MB) of memory standard (varies with model). The Premium/386C memory board can hold up to 16 MB of memory.
- Battery-backed clock/calendar

- Availability of 5.25-inch, 1.2-MB floppy drives. Optional 3.5-inch, 1.44-MB or 5.25-inch 360-KB drives are also available.
- Availability of fast access, high-capacity fixed disk drives from 40-MB to 320-MB
- MD-DOS® and GW-BASIC® included with system
- Software disk cache for increased fixed disk performance in disk-intensive applications such as data base programs. Disk cache works with conventional, expanded, or extended memory configurations.
- Shadow RAM for faster execution of low-level operations. Shadow RAM allows basic input output system (BIOS) to be executed from high-speed, write-protected, 32-bit RAM rather than 16-bit read-only memory (ROM).
- Availability of high-capacity tape backup subsystem
- Automatic self-test diagnostic when power is turned on or system is reset
- Standard 101-key national keyboard
- Keyboard-switchable microprocessor speeds of low, medium, and fast. Simple keystrokes let you change from one speed to another.
- Automatic processor slowdown during floppy accesses provides compatibility with copy-protected programs

Hardware Overview

The Premium/386C consists of two standard components, the system unit and the keyboard (Figure 1).

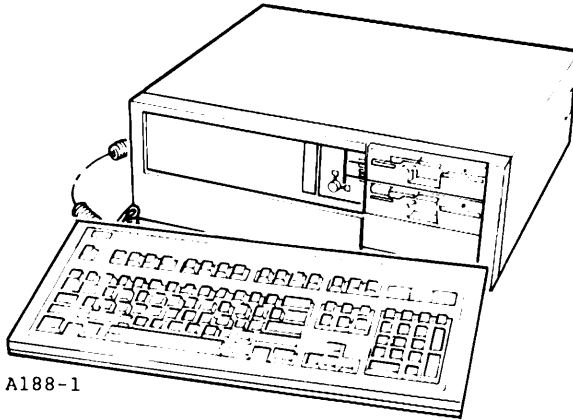


Figure 1. Premium/386C.

System Unit

The system unit contains a floppy drive, Premium/386C memory board, system board, and power supply. In addition, some models of the Premium/386C include ST-506 format or enhanced small interface device (ESDI)-format fixed disks.

Front Panel Lights

The front panel lights on the system chassis (Figure 2) show you the CPU speed (low, medium, high), whether or not the fixed disk is being accessed, and whether or not the auto slowdown feature is enabled.

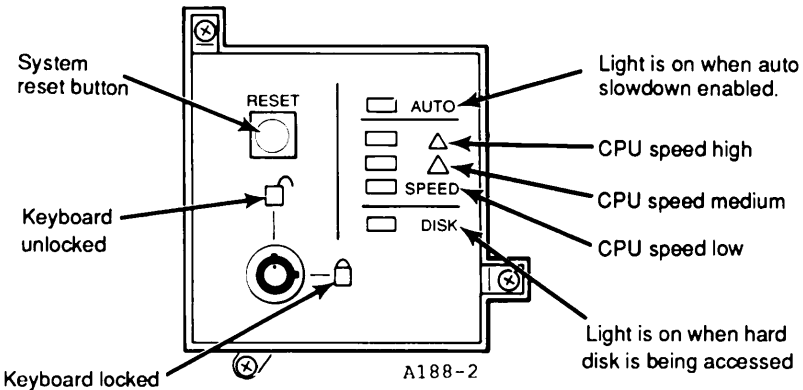


Figure 2. Front Panel Lights.

Floppy Disk Drives

The minimum configuration of the Premium/386C has one 1.2-MB floppy drive. The Premium/386C supports 5.25-inch or 3.5-inch drives.

Premium/386C Memory Board

Inside the Premium/386C system unit is an Premium/386C memory board. The amount of memory on the board, between one and two MB, is determined by model.

The Premium/386C uses single inline memory modules (SIMMs) and can hold up to 16 MB of memory. The memory board also contains 64 KB of fast access 25-ns static RAM for use as a memory cache.

System Board

There are six available slots on the Premium/386C system board. (The seventh slot is dedicated to the Premium/386C memory board.) Two slots are standard XT or 8-bit slots. One slot is a standard PC AT or 8/16-bit slot. The remaining three are SMARTslots. SMARTslot Architecture consists of an arbitrated, multimaster bus that is AT-compatible. *Any board designed for an XT 8-bit or AT 8/16-bit slot will work in a SMARTslot.*

A floppy controller is built into the system board. The controller supports both 5.25-inch and 3.5-inch floppy drives and tape units. The controller supports up to three floppy devices with drivers supplied by AST. The Premium/386C provides front panel access to three half-height devices. Additionally, you may install two half-height or one full-height device internally.

Keyboard

A standard 101- or 102-key keyboard is included with the Premium/386C. Keycap kits for international language use are available from AST.

Fixed Disk

Fast access, fixed disk drives are available as options with your Premium/386C. Model 340 includes a 40-MB fixed drive that is ST-506 format. Three other models of the Premium/386C include ESDI-format drives: model 390 includes a 90-MB fixed drive, model 3150 includes a 150-MB drive, and model 3320 includes a 320-MB drive.

All AST drives are formatted and partitioned with MS-DOS® at the factory. All AST fixed disk drive heads (over 20-MB drive capacity) are automatically parked when your computer is turned off. Whenever you move or ship the system, the heads are already parked.

Tape Drive

You may add a tape drive to back up files from a fixed disk. AST offers a high-speed tape system (hardware and software) that copies files from your fixed disk to magnetic tape cartridges. The tape drive is available as an option.

Introducing AST Premium/386C

Software Overview

Premium/386C operation is controlled by firmware on the system board and a disk operating system. MS-DOS and GW-BASIC are provided with the Premium/386C.

A software disk cache program for fixed disks is provided with all Premium/386C models.

Utility software programs provided with your Premium/386C include:

- **ASTMENU:** provides a common user interface (CUI) that enables you to run system tests, install utilities, and configure your fixed disk.
- **ASTcache™:** improves the performance of disk-intensive applications on your fixed disk by accumulating copies of recently used disk sectors and storing them for future use. The disk cache is accessed first when your computer searches for information.
- **ASTEMM:** enables you to use extended memory to emulate expanded memory. AST's expanded memory manager for the Premium/386C supports the full EMS Version 4.0 industry standard specification.
- **ASTDSK:** enables you to add a third floppy device.
- **fASTDISK™:** creates a virtual disk in RAM called a RAM disk. Application speed increases when an application program is stored on the RAM disk.

- SuperSpool™: creates a print spooling buffer in RAM that receives print files and relays them to the printer.
- SPEED: enables you to change the CPU speed or auto slowdown feature by entering commands at the DOS prompt. You can also use the SPEED command to enable or disable memory caching without running ASTSETUP.
- 386Test: runs diagnostic tests on the hardware components in your computer. None of the tests require your intervention once they begin. The tests take a limited amount of time and do not destroy any information stored on your computer's fixed disk.

AST's CUI, ASTMENU, enables you to configure the system, run system tests, install AST utility software, and install MS-DOS from a single, menu-driven program. The *AST Premium Utility Software User's Manual* explains the installation and use of each program on the common user interface.

Format Notation

This manual uses the following format notation:

- ***Boldface*** characters indicate information you enter.
- *Uppercase characters* indicate items (such as commands) that you enter as shown. You may type either upper- or lowercase characters.
- *Lowercase characters* represent parameters you define. These parameters must satisfy the conditions of the command descriptions.
- *Angle brackets (<>)* tell you to press a key. For example, <Esc> tells you to press the Esc key. Only press the Enter key when you see the instruction <Enter>.

- *Keys joined by dashes* are to be pressed simultaneously, then released. For example, <Ctrl>-<Alt>-<Del> tells you to press the Ctrl and Alt keys while pressing the Del key.
- *Square brackets* ([]) indicate an optional term you may omit. Do not enter the brackets.
- *Color* indicates prompts and messages you see on the screen.
- *A trailing lowercase "h"* indicates a hexadecimal number (for example, 02C0h).

Terms You Should Know

The following terms are used throughout this manual. For more definitions, see the Glossary.

ASTMENU

A CUI menu that provides easy access to ASTSETUP and other software programs provided by AST.

ASTSETUP

A program you use to change and write the system configuration.

Cache Memory

The memory cache is 64 KB of very fast, zero-wait-state memory located on the cache memory board. When the CPU attempts to access an address in main memory, it searches the cache first. If the address is found, the corresponding data is sent to the CPU at the speed of the cache, avoiding the longer access time to main memory.

Conventional (base) memory

Linear memory between 0 and 640 KB. MS-DOS can directly access all conventional memory. Your computer does not need any special software to use conventional memory.

Enhanced Small Device Interface (ESDI)

A fixed disk drive interface supporting 10 megabit or greater data transfer rate per second. The data separator on an ESDI interface is on the drive rather than the controller, providing fast and reliable performance.

Expanded memory

Memory beyond the 640 KB range of base memory that is accessed by memory paging. To use Premium/386C expanded memory, Premium/386C expanded memory manager software and special expanded memory application or operating environment software is required. This application software must conform to either the Expanded Memory Specification (EMS) and/or the Enhanced Expanded Memory Specification (EEMS). Unlike 8088- or 80286-based systems, expanded memory on 80386-based systems such as the Premium/386C is provided by using extended (linear) memory and the expanded memory manager software driver -- the 80386 CPU includes built-in expanded memory hardware.

Extended memory

Linear memory in the 1- to 16-MB address range. Under MS-DOS, extended memory is usually used for random access memory (RAM) disks, print spoolers, and software caches. The OS/2 and XENIX operating systems directly address up to 16 MB of physical extended memory.

Kilobyte (KB)

1024 bytes -- an amount of memory such as 8 KB is shorthand for 8192 bytes.

Linear memory

Any memory that can be addressed without memory paging. Linear memory includes both conventional and extended memory.

Megabyte (MB)

1024 kilobytes. An amount of memory such as 2 MB is another way of saying 2048 kilobytes.

Shadow RAM

An area of random-access memory (RAM) reserved for use as an alternate high-speed access to the system's basic input output system (BIOS). BIOS programs control the computer's lowest level operations. They are the interface between computer hardware and software. Usually, BIOS programs reside permanently in 16-bit read-only memory (ROM). Premium/386C allows you to copy the BIOS into 32-bit RAM each time the system power is turned on. Once the BIOS is copied to this area of RAM, the area is write protected; the BIOS remains in RAM until the system is turned off. Since the area containing the copied BIOS is not acting as traditional RAM, it is called shadow RAM.



PART I. GETTING STARTED

1. Before You Begin
 2. Hardware Installation
 3. Running ASTSETUP
- 
- 

NOTES



Part I contains the information you will need to perform the following:

- Check package contents (Section 1).
- Assemble computer components (Section 2).
- Run ASTSETUP (Section 3).

To install Premium/386C utility software, see your *AST Premium Utility Software User's Manual*.

1.1 Checking the Contents

In addition to this manual (AST part number 000842-001), your package should contain:

- System unit
- Power cord
- Keyboard
- Disks: MS-DOS and AST Utility Software
- *AST Premium Utility Software User's Manual*
- *MS-DOS Manual*
- *GW-BASIC® Manual*

Contact your authorized AST reseller immediately if any components are damaged or missing.

NOTE

Do not discard the packing materials. If your Premium/386C ever needs to be shipped, it must be packed in these special shock-absorbing materials. Systems returned to the factory in nonapproved containers may be refused and your warranty may be voided. Contact AST Research for replacement shipping containers.

1.2 System Compatibility

The following two sections describe hardware and software compatibility.

1.2.1 System Hardware

You may install both XT and AT-compatible add-in boards in the Premium/386C.

Either 3.5-inch or 5.25-inch floppy drives may be added. Full- or half-height fixed drives may be installed. Fast access, fixed disk drives with capacities from 40 to 320-MB are available from AST.

You may also install a tape backup unit. High-capacity tape drives are available from AST.

Premium/386C model 340 has an ST-506 fixed disk drive controller. Only ST-506 format fixed drives may be used with this controller. ST-506 format fixed disk drives are available from AST in 40- and 70-MB capacities.

Premium/386C models 390, 3150, and 3320 have ESDI fixed disk drive controllers. Only ESDI-format fixed disk drives may be used with this controller.

ESDI-format fixed disk drives are available from AST in 90-, 150-, and 320-MB capacities.

1.2.2 Software

Premium/386C supports most AT-compatible operating systems, including MS-DOS.

Your package includes GW-BASIC.

Certain copy protection routines in application software prevent the application from being loaded when the computer operates at the full 20 MHz. If your application program does not load properly when the computer is running at 20 MHz, enable the auto slowdown feature in ASTSETUP. (Auto slowdown decreases the machine speed to medium from high when the floppy drive is being accessed, and then returns the speed to 20 MHz.) When auto slowdown is enabled, the Auto light on the front panel is lit.

NOTES



Section 2 shows you how to put together your system components. Once your computer is set up, you can start using it right away. You will need a Phillips screwdriver to perform this procedure. To assemble your Premium/386C, complete the following steps:

STEP 1

Remove the drive insert. Set the system unit on a flat surface. Do not connect the power cord yet! Remove the insert from the floppy drive (Figure 2-1). (If you have a 3.5-inch drive, you may need to press the floppy eject button to remove the insert.)

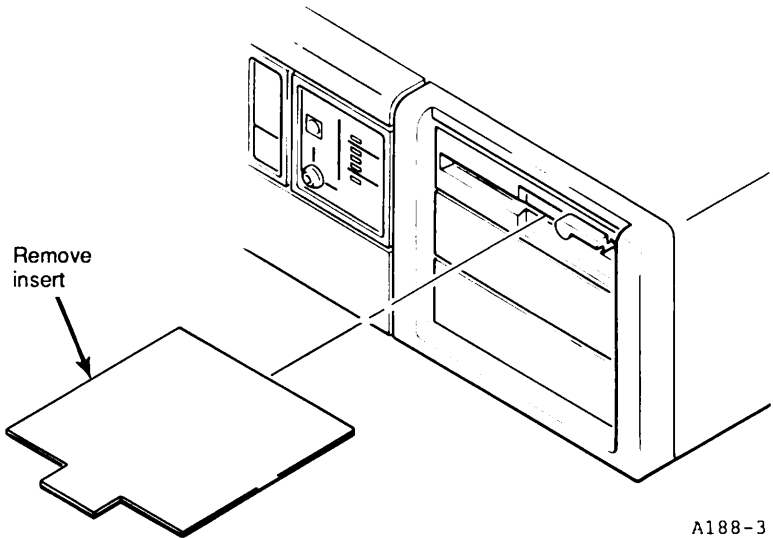


Figure 2-1. Removing the Disk Drive Insert.

STEP 2

Open the unit. At the factory, the primary video display switch inside your Premium/386C is set for a color adapter. If you do not need to change the video display adapter default setting and you are not installing add-in boards, proceed to Step 7.

If you need to add a video adapter board, change the primary video display switch setting, or want to install add-in boards, open the system unit. Remove the back panel screws. Use a flathead screwdriver to remove the five slotted hex screws from the back panel (Figure 2-2).

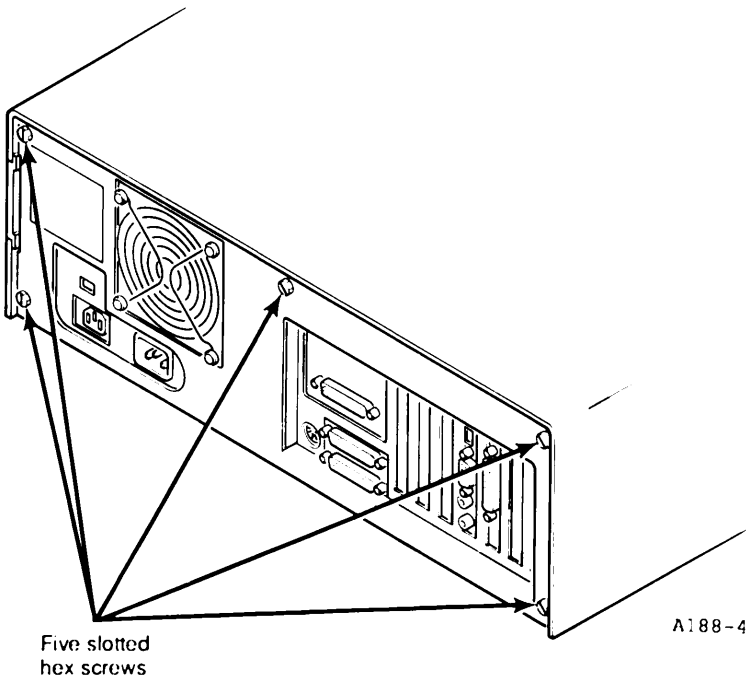


Figure 2-2. Removing the Back Panel Screws.

STEP 3

Remove the system unit cover. Slide the system unit cover past the ON/OFF switch, then lift it straight off the unit (Figure 2-3).

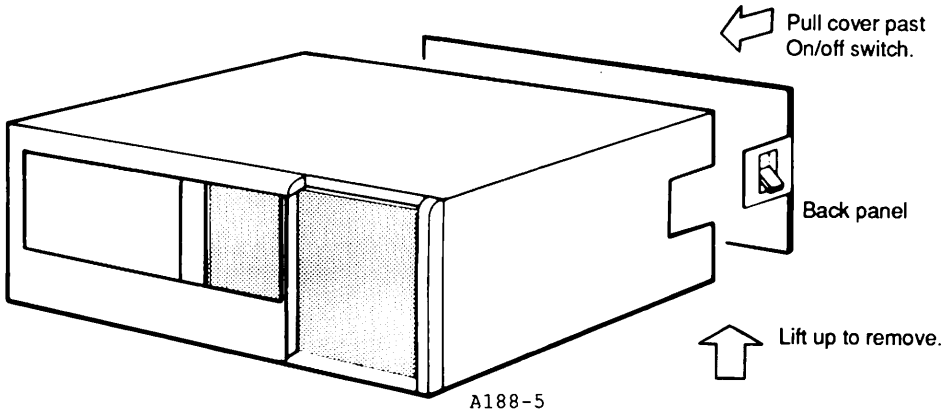


Figure 2-3. Removing the Cover.

STEP 4

Find the slide switch located on top of the panel behind the front panel indicators. As you face the front panel, slide this switch to the left if you will be using a monochrome adapter (Figure 2-4). Leave the switch positioned to the right if you will be using a color adapter.

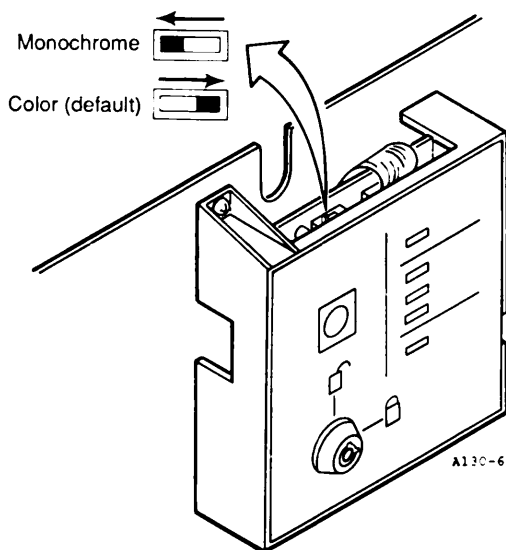


Figure 2-4. Setting the Primary Video Display Adapter Slide Switch.

STEP 5

Install and configure any other add-in boards or devices.

Installation instructions are provided in Appendix B. Write down the names of all add-in products installed in your machine. If available, also record their port or memory addresses, direct memory access (DMA) channel, and interrupt request lines (IRQ).

If you are installing a fixed disk, write down the drive type and its size in MB. You will need this information when you run **ASTSETUP**.

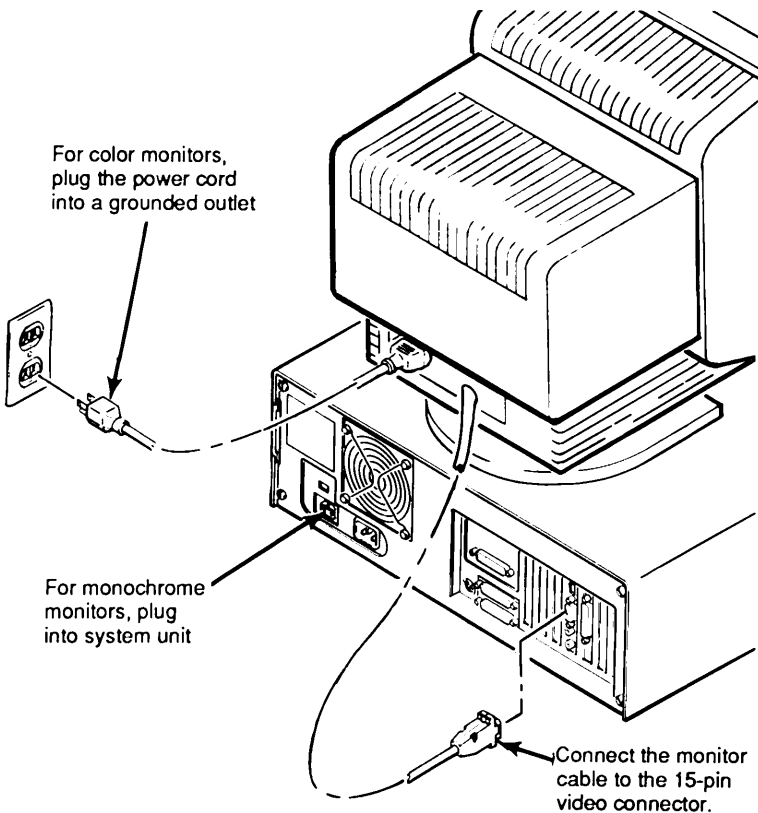
STEP 6

Set the cover back on your Premium/386C and slide it into place against the back panel. Replace the five screws you removed from the back panel.

STEP 7

Add the monitor. If your Premium/386C system includes an AST monitor, snap the monitor onto its base. Connect the monitor cable to the system unit (Figure 2-5). (Monochrome, enhanced color, and VGA monitors are available from AST.)

Plug the AST monochrome monitor power cord into the video display adapter. The enhanced color and VGA monitor power cables plug into a grounded wall outlet.



A188-7

Figure 2-5. Connecting a Monitor.

STEP 8

Plug the keyboard into the connector at the back of the computer (Figure 2-6).

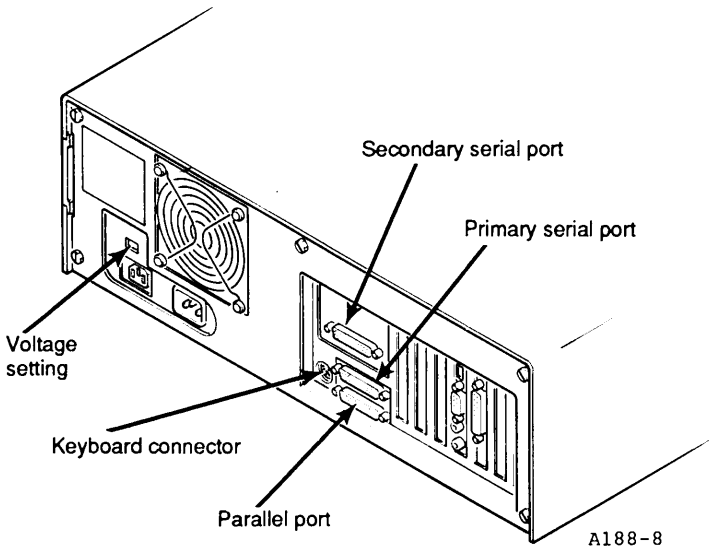


Figure 2-6. Plugging in Peripheral Devices.

STEP 9

Plug peripheral devices (if any) into the built-in serial and parallel ports (Figure 2-6). The parallel port is usually used for printers and plotters, although some other peripherals may use it. The serial ports can be used by modems, printers, mouse devices, and so on.

STEP 10

Check the voltage setting (Figure 2-6). The setting should display 115 volts for operation in the United States, Canada, and Mexico and 230 volts for use elsewhere. Plug the power cord into the system unit and then into a grounded wall outlet.

Refer to Section 3 for detailed information on ASTSETUP.



This section tells you how to run ASTSETUP. ASTSETUP is an option on ASTMENU and also resides in the Premium/386C basic input/output system (BIOS) firmware. You can access ASTSETUP without a disk. Run ASTSETUP when:

- You complete a Premium/386C hardware installation.
- You replace the battery on a Premium/386C.
- You add or remove floppy or fixed disk drives (except a third floppy device not designated as A or B).
- You add or remove linear (conventional or extended) memory. You do not need to run ASTSETUP to run expanded memory software in extended memory (using the Premium/386C expanded memory manager), or to add physical expanded memory from a 16-bit option board such as AST's Rampage/286.
- You change your primary video display adapter type.

ASTSETUP writes your system configuration into battery-maintained memory. Battery-maintained memory stores your configuration and is read each time you boot the machine. Some devices, such as floppy and fixed drives, are not recognized by the system until they are established by ASTSETUP and written to memory.

In addition to hardware, ASTSETUP controls many Premium/386C features. Run ASTSETUP if you want to change the following:

- Date and time
- Amount of conventional memory
- Amount of extended memory
- Built-in ports enabled or disabled
- On-board floppy disk controller enabled or disabled
- Automatic slowdown during floppy access
- System's default operating speed
- Shadow RAM enabled or disabled
- Numeric keypad lock (numlock) when the computer is turned on
- Cache memory access enabled or disabled
- Booting without keyboard plugged into computer

To use the firmware version of ASTSETUP:

STEP 1

Press the RESET button on the front panel, or turn your system off, then on.

STEP 2

Press <Ctrl>-<Alt>-<Esc> and hold the keys down as the Power-On Self Test (POST) messages appear.

STEP 3

After the following message appears:

KEYBOARD ERROR OR NO KEYBOARD PRESENT
PRESS F1 KEY TO CONTINUE OR CTRL-ALT ESC
FOR SETUP

Press <Ctrl>-<Alt>-<Esc>. (The <Ctrl>-<Alt>-<Esc> hot-key sequence into ASTSETUP is disabled after DOS has booted.)

To use the floppy disk version of ASTSETUP:

STEP 1

Boot your machine with the Premium/386C Utility Software disk.

STEP 2

Select the Run ASTSETUP option from ASTMENU.

After you press <Ctrl>-<Alt>-<Esc> or type ASTSETUP, the first ASTSETUP screen appears (Figure 3-1).

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Page 1

DATE (MM/DD/YY)	08/17/88				
TIME (HH:MM:SS)	09:00:00				
DISKETTE A	1.2 MB				
DISKETTE B	NONE				
	TYPE	CYCLS.	HEADS	SECTORS	PRECOMP
FIXED DISK 1	23	805	4	26	NONE
FIXED DISK 2	NONE				
VIDEO ADAPTER	EGA/VGA				
PRIMARY VIDEO	COLOR				
CONVENTIONAL MEMORY	640				
EXTENDED MEMORY	0	(0.000MB)			
EXTENDED MEMORY FOUND	0				
RESERVED MEMORY	384				

↑↓, ←→ moves between items, ←→ selects values

F10-Record Changes, F3-Add Drive Type, F2-Previous Page, F1-Exit

Figure 3-1. ASTSETUP -- First Screen.

Each field in ASTSETUP uses the same keystrokes. To accept the displayed value, press <Enter>. To see the valid choices for the current field, press <Left Arrow> or <Right Arrow>. Each field is described in the following pages.

Date

Establishes the date maintained by the system's battery. Enter the current date in a month/date/year format. For example, enter December 17, 1988 as 12/17/88.

Time

Establishes the time maintained by the system's battery. Enter the current time in an hour:minute:seconds format using a 24-hour clock. For example, enter 1:00 pm as 13:00.

**Diskette A *or*
Diskette B**

Identifies the type of floppy disk for drive A or B. The five choices are NONE, 360-KB (5.25-inch standard), 1.2-MB (5.25-inch high-density), 720-KB (3.5-inch standard), or 1.4-MB (3.5-inch high-density).

**Fixed Disk 1 *or*
Fixed Disk 2**

Designates the disk type of your first or second fixed disk. If your new system includes an AST fixed disk, the drive type has been entered at the factory; *do not change it*. If you do not have a fixed disk, enter 0 to specify None.

NOTE

Write down the drive type for future reference. If the type is accidentally changed, the data on the disk may be corrupted.

If you are installing a fixed disk, use Table 3-1 to determine your disk type.

If your fixed disk is not included in Table 3-1, refer to Section 3.1 for drive configuration instructions.

Table 3-1. Disk Types.

Type	Cyls	Hds	Pre	LZ	Sctrs	MB*	Drive Make/Model
01	611	16	None	611	63	315.3	Miniscribe 9380E ** CDC 94186-383H **
02	615	4	300	615	17	21.4	Seagate ST-225 Miniscribe 3425/8425F Tandon TM-262/362 Conner 322 ***
03	615	6	300	615	17	32.1	Seagate ST-138 Fujitsu M2226D
04	940	8	512	940	17	65.5	
05	940	6	512	940	17	49.1	
06	615	4	None	615	17	21.4	NEC D3126 Seagate ST4026
07	462	8	256	511	17	32.2	
08	733	5	None	733	17	31.9	Seagate ST-4038
09	900	15	None	901	17	117.5	
10	1023	10	0	1024	17	89.0	CDC Wren III HH ** 94216-106
11	968	14	0	969	17	118.0	CDC 94166-141 **
12	1023	14	None	1024	17	124.7	Micropolis 1354A **
13	968	16	0	969	17	134.8	CDC Wren III ** 94166-182
14	733	7	None	733	17	44.7	
15	0	0	0	0	0	0	Reserved
16	612	4	0	663	17	21.3	NEC D5126 Microscience HH825
17	977	5	300	977	17	42.5	Seagate ST4051
* MB = millions of bytes All drives are ST-506 interface except: ** ESDI; *** AT-embedded controller. ESDI drives require optional ESDI controller.							

Continued

Table 3-1 *Continued.*

Type	Cyls	Hds	Pre	LZ	Sctrs	MB*	Drive Make/Model
18	1223	14	None	1224	17	149.0	Maxtor XT4170E **
19	1024	7	512	1024	17	62.4	Microscience HH-1075 Micropolis 1324A
20	733	5	300	733	17	31.9	
21	733	7	300	733	17	44.7	
22	782	4	None	782	27	43.2	WD 93044-A1 ***
23	805	4	None	805	26	42.9	Conner 342 *** Conner 344 *** Miniscribe 8051A ***
24	1053	3	None	1053	28	45.3	Rodime 3055T ***
25	1053	7	None	1053	28	105.7	Rodime 3130T ***
26	968	7	0	969	34	118.0	CDC 94166-141 **
27	1023	7	None	1024	34	124.7	Micropolis 1354A **
28	1223	7	None	1224	34	149.0	Maxtor XT4170E ** Micropolis 1551
29	1223	11	None	1224	34	234.2	Maxtor XT4280E ** Micropolis 1554
30	1223	13	None	1224	34	276.8	Micropolis 1556 **
31	989	5	0	989	17	43.0	CDC Wren II HH 94205-51
32	968	9	0	969	34	151.7	CDC Wren III ** 94166-182
33	1023	5	0	1024	34	89.0	CDC Wren III ** HH 94216-106
* MB = millions of bytes All drives are ST-506 interface except: ** ESDI; *** AT-embedded controller. ESDI drives require optional ESDI controller.							

Table 3-1 *Continued.*

Type	Cyls	Hds	Pre	LZ	Sctrs	MB*	Drive Make/Model
34	1223	15	None	1224	34	319.3	Miniscribe 9380E ** CDC 94186-383H **
35	1024	9	1024	1024	17	80.2	Seagate ST-4096
36	745	4	None	745	28	40.7	Miniscribe 8048 ***
37	833	8	0	833	33	112.59	Conner 3114 ***
38	823	10	256	824	17	71.6	
39	1631	15	None	1632	48	576.2	Maxtor XT8760E *
40	615	8	128	664	17	42.8	NEC D5146/D5146H
41	917	15	None	918	17	119.72	Maxtor XT1140
42	1023	15	None	1024	17	133.6	
43	776	8	None	776	33	104.9	Conner 3102 *** Conner 3104 ***
44	820	6	None	820	17	42.8	Seagate ST-251
45	1024	8	None	1024	17	71.3	Micropolis 1325 Microscience 6085 Maxtor XT1085 Tandon TM3085 MiniScribe 6085
46	925	9	None	925	17	72.5	CDC Wren II 94155-86
47	1024	5	None	1024	17	44.6	Micropolis 1323A MiniScribe 3053 Microscience HH-1050+
* MB = millions of bytes All drives are ST-506 interface except: ** ESDI; *** AT-embedded controller. ESDI drives require optional ESDI controller.							

NOTE

Drive types 10, 11, 12, 13, and 18 are for Novell NetWare file server use with versions of NetWare supporting 17-sector drives only. Use drive types 26, 27, 28, 32, and 33 for other operating systems supporting 34-sector drives.

If you are installing MS-DOS on a Miniscribe 9380E or CDC 94186-373H, the full capacity of the disk cannot be utilized due to MS-DOS limitations. Enter drive type 01 if you have one of these drives and are using MS-DOS. Although the loss of storage space is minimal, enter drive type 34 to maximize disk space if you are using XENIX, Novell, or any other operating system that supports fixed disks with more than 1024 cylinders.

Drive capacities shown in this table are calculated from manufacturer's specs $[(CYLS) \times HDS \times SCTRS \times 512] / 1,000,000$ and do not allow for normal media defects or areas reserved by the operating system. Net usable capacity may vary between drives, and is usually slightly less than shown.

Assignment of specific drive makes or models is derived from information supplied in drive manufacturer's literature and is believed to be reliable. However, except for factory-installed or optional drives supplied by AST Research, listed drives are not necessarily tests or endorsed by AST. Therefore, the accuracy of this information and compatibility of specific drives not supplied by AST, cannot be guaranteed. Substitution of non-AST supplied drives may degrade system performance. Please contact the drive vendor for more application information.

Video Adapter

Identify your primary video display adapter type. Valid types are:

MONO Screen displays only one color

COLOR 80 Screen display 80-columns wide

EGA/VGA Enhanced graphic adapter (EGA), video graphic array (VGA), or professional graphics adapter (PGA)

Primary Video

Displays the setting of the primary display adapter switch; *for reference only*. If your Video Adapter field is COLOR 80 or EGA/VGA, this field should be COLOR.

Conventional Memory

Establishes the amount in KB of conventional memory. MS-DOS can directly access all conventional memory. Select 640 KB unless you have a software package requiring a maximum configuration of 512 KB of conventional memory.

Extended Memory

Establishes the amount in KB of extended linear memory addressable above the 1-MB boundary. Extended memory does not include video memory or hardware cache memory.

Memory for all models is pre-configured at the factory. If you are adding memory, make sure you set the memory board switches correctly. The next field, Extended Memory Found, indicates how much memory is installed on your computer.

Extended Memory Found

Displays the amount of memory above the 1-MB boundary found during POST; *for reference only*.

Reserved Memory

Displays the amount of memory reserved for AST enhancements such as Shadow RAM and ASTEMM, *for reference only*.

Reserved memory is not normally accessible by DOS applications.

After entering the Extended Memory field, press <F2> to display the second screen of ASTSETUP fields (Figure 3-2).

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Page 2

MathCoproprocessor Enable	ENABLE
Math Coprocessor Type	80387 (20 MHz)
Parallel Port Interrupt Select	IRQ7
Parallel Port Select	378h (LPT1)
Serial Port 1	3F8h (COM1)
Serial Port 2	2F8h (COM2)
Onboard Floppy Disk Controller	ENABLE
Auto Slowdown	DISABLE
Default Speed	HI
Shadow RAM	ENABLE
Num Lock After Boot	ENABLE
Boot Without Keyboard	DISABLE
Memory Caching	ENABLE

↑↓ moves between items, ←→ selects values
F10-Record Changes, F2-Previous Page, F1-Exit

Figure 3-2. ASTSETUP -- Second Screen.

Math Coprocessor

Determines whether or not you have a math coprocessor. Select **ENABLE** if you have a coprocessor; select **DISABLE** if you do not.

Math Coprocessor Type

Designates your math coprocessor as an 80287 or 80387 chip.

Parallel Port Interrupt Select

Establishes the interrupt request line (IRQ) to be used by the parallel port on Premium/386C. If the port is configured as LPT1, select IRQ7. (Most users choose IRQ7). If the port is configured as LPT2, select IRQ5.

Parallel Port Select

Establishes the hexadecimal input/output (I/O) address, 278 or 378 assigned to the built-in parallel port. Your selection designates the physical address of the port. The logical address (LPT1, LPT2, or LPT3) appears next to the physical address.

The logical address varies according to the other parallel ports in your system. If an address conflicts with other parallel ports in your system, a message appears indicating the port should not be selected. (See Appendix E for more information on parallel ports.)

To disable the built-in parallel port, select **DISABLE**.

Serial Port 1

If only one built-in serial port is enabled, it must be Serial Port 1.

Establishes a hexadecimal I/O address and device name for Serial Port 1. Available addresses and device names vary according to the serial ports installed in your system. Possible selections are 3F8h (COM1), 2F8h (COM1), 2F8h (COM2), or DISABLE.

Usually, this field is 3F8h (COM1). If another device has taken the address assigned to Serial Port 1, CONFLICT appears next to the address. For example, 3F8h CONFLICT indicates another device (usually an add-in board) has taken I/O address 3F8h. In case of a conflict, change the I/O address of the conflicting device, choose a different I/O address for Serial Port 1, or disable Serial Port 1.

(Serial Port 1 is labelled on the Premium/386C back panel; it is the lower port.)

Serial Port 2

You cannot enable Serial Port 2 if Serial Port 1 is disabled.

Select a hexadecimal I/O address and device name for Serial Port 2. Available selections are 2F8h (COM2) or DISABLE.

Usually, this field is 2F8h (COM2). However, if the address 2F8h has been taken by another device, CONFLICT appears next to the address. In case of a conflict, you must change the I/O address of the conflicting device or disable Serial Port 2.

(Serial Port 2 is labelled on the Premium/386C back panel; it is the upper port.)

NOTE

Additional information on serial ports is provided in Appendix E.

Onboard Floppy Disk Controller

Determines whether or not the floppy disk controller located on the Premium/386C system board is used. Do not change this field unless you have a special reason to disable the disk controller, such as using an external floppy controller.

Auto Slowdown

Allows the CPU speed to decrease from fast to medium when accessing a floppy drive. The slowdown is necessary to accommodate some copy-protected software.

Normally, Auto Slowdown is always set to DISABLE. (Auto slowdown works only if the CPU speed is set to fast. It will not decrease the speed from medium to slow.)

Default Speed

Indicates the default CPU speed: LOW, MEDIUM, or FAST. Most users should select FAST. Typically, LOW and MEDIUM speeds are needed only by some application and game software.

Shadow RAM

Determines whether or not the BIOS is copied to and executed from 32-bit RAM rather than 16-bit ROM during system processing. Normally, this field is set to ENABLE. It should be DISABLE only if you have software that is not CPU speed independent.

Numeric Lock at Boot

Determines whether or not numeric lock is on or off when your system is turned on. If you select ENABLE, the numeric keys on your keyboard enter numbers when the system is booted. If you select DISABLE, the numeric keys are cursor controls.

Memory Caching

Determines whether the memory cache is enabled or disabled. Enabled cache increases the processing speed of *CPU-intensive* applications such as spreadsheet and computer-aided design (CAD) programs. In addition, compilers run faster with cache enabled.

Unlike the memory cache provided by ASTcache software, the disk cache is designed primarily for *disk-intensive* applications such as data base programs. However, enabling memory cache also increases the processing speed of programs using the disk cache.

Boot Without Keyboard

This field allows you to boot your computer without a keyboard plugged in. If you disable this field, errors appear unless a keyboard is plugged in. This feature is especially useful in network environments.

After completing ASTSETUP, press <F10>. The following prompt appears:

PRESS F5 TO CONFIRM UPDATE

To verify your responses as correct and to save your new configuration, press <F5>.

Press any other key to return to the first field on the screen, or press <F1> to exit ASTSETUP without saving your changes.

If you press <F5>, your system will automatically be rebooted with the new configuration. After rebooting, your system is ready to use.

3.1 Using the ASTSETUP Drive Installation Screen

If your fixed drive type is not listed in Table 3-1, press <F3> to enter configuration information for your disk type. An information message appears, followed by the ASTSETUP Drive Type Installation Screen. Enter the requested information provided with your fixed disk (Figure 3-3).

NOTE

Shadow RAM must be enabled if you use this option.

ASTSETUP Drive type installation

Check your disk and computer manuals for instructions and warnings

Drive Type	98
Number of Heads	16
Number of Cylinders	1024
Number of Sectors Per Track	58
Write Precompensation	None
Landing Zone	1024

Use ←→ to select other drive type
↑↓ move between lines
F3 exits to page 1

Figure 3-3. ASTSETUP Drive Installation Screen.

CAUTION

The values for number of heads, cylinders, and sectors per track must be correct. If incorrect values are given for these items, you may experience intermittent problems, including loss of data and eventual system failure.

Drive Type

Select either 98 or 99, but do not use the same selection for Fixed Disk 1 and Fixed Disk 2 if the drives require different configurations. For example, if you have two different fixed disks and identify Fixed Disk 1 as disk type 98, use disk type 99 for Fixed Disk 2.

Number of Heads

Enter the number of heads, as stated in the manufacturer's documentation. This is a number from 1 to 16, and may be referred to as "number of data heads" or "number of read/write heads."

Number of Cylinders

Enter the number of cylinders provided with the drive, from 1 to 2048. Some operating systems, including MS-DOS Version 3.3, cannot support more than 1024 cylinders.

Enter the number of sectors per track, as described in the manufacturer's documentation. Valid entries range from 1 to 63.

Write Precompensation

Enter the number identified by the manufacturer, if provided. Valid entries are from None to 2047, and cannot be equal to or greater than the Number of Cylinders value. If the manufacturer did not provide this information, enter the number that you entered in the Number of Cylinders field. When you proceed to the next field, the entry will change to None.

Landing Zone

Enter the landing zone identified by the manufacturer, from 1 to 2048. If the landing zone is not identified, enter the number of the highest cylinder. For example, if you entered 1223 as the Number of Cylinders value, enter 1223 here.

When your drive type entries are complete, press <F3> to return to the first screen. Enter the drive type number (98 or 99) in the Fixed Disk 1 or Fixed Disk 2 field.

PART II. USING PREMIUM/386C

4. Premium/386C Hardware

5. SPEED Commands

NOTES

This section tells you how to operate your Premium/386C components, including disks, keyboard, and monitor.

In addition, this section tells you how to reboot, maintain, and move the Premium/386C. Whether you are a new or experienced computer user, you should read this section.

4.1 Using Disks

A computer uses disks to file and display information. This section gives you some basic information on disks and compatibility.

4.1.1 Disk Types

"Disk" is a generic term for *floppy disks*, *fixed disks*, and *RAM disks*.

- *Floppy disks* (also called "floppies" or "diskettes") are removable disks. Premium/386C accommodates four different floppy disk drive types:

360-KB (5.25-inch standard)

1.2-MB (5.25-inch high-density)

720-KB (3.5-inch standard)

1.4-MB (3.5-inch high-density)

The capacity of each disk is limited, but you can use as many disks as you want. You can store different information on individual disks, then insert a particular disk whenever you need it. Once information is stored on a floppy disk, it remains there until it is overwritten (or the disk is formatted or damaged). Turning off your computer will not affect the data.

- *Fixed disks* (also called hard disks) are installed inside your computer. You can add or remove fixed disk drives, but normally you do not interchange them like floppy disks. You can read or write to a fixed disk, but its total capacity is finite. Like floppy disks, once information is stored on a fixed disk, it remains there until it is deleted or the disk is formatted or damaged. Turning off your computer will not affect the data. However, do not turn off the computer while the disk access light is lit.

All AST fixed disks above 20-MB capacity have an "auto park" feature, which means no special utility program is needed to park the disk head. (With other fixed disks, you may need to park the disk head before you move your system to prevent damage to the drive.)

- *RAM disks* (also called "virtual" disks) use your computer's RAM as if it were a disk drive. RAM disks are not limited by the speed of a mechanical drive, so they work faster than floppy and fixed disks. The biggest drawback of RAM disks is that they lose the information stored on them once you turn off your computer. Even a brief electrical power outage will cause all information in a RAM disk to be lost. To use a RAM disk, you must copy data to the disk when you turn on the computer. Then, before turning off the computer, you must copy the data from the RAM disk to a floppy or fixed disk.

Additional information on disks is provided in your *MS-DOS Manual* and *AST Premium Utility Software User's Manual*.

4.1.2 Disk Compatibility

Premium/386C includes a floppy disk drive. Your computer can accommodate 3.5-inch or 5.25-inch disk drives. The size of the disk and drive must always be the same. For example, you can only use 3.5-inch disks in a 3.5-inch drive.

5.25-inch drives and disks come in two capacities: 360-KB (double-density) and 1.2-MB (high-density). For reliable performance, always format and use the same type of disk and drive. For example, use a high-density disk in a high-density drive. However, if you need to use different capacities of disks and drives, use the following guidelines:

In a 360-KB drive (5.25-inch double-density, AST part number 500511-001):

- 360-KB disks can be formatted, read, and written.
- 1.2-MB disks cannot be formatted, read, or written.

In a 1.2-MB drive (5.25-inch high-density, AST part number 500511-002):

- 360-KB disks can be read. 360-KB disks may be formatted using the MS-DOS command `FORMAT/4`. Data written on 360-KB diskettes in a 1.2-MB drive may not be readable in a 360-KB drive.
- 1.2-MB disks can be formatted, read, and written.

3.5-inch drives and disks come in two capacities: 720-KB (double-density) and 1.44-MB (high-density). For reliable performance, always format and use the same type of disk and drive. For example, use a high-density disk in a high-density drive. However, if you need to use different capacities of disks and drives, use the following guidelines:

In a 720-KB drive (3.5-inch double-density):

- 720-KB disks can be formatted, read, and written.
- 1.44-MB disks cannot be formatted, read, or written.

In a 1.44-MB drive (3.5-inch high-density, AST part number 500511-003):

- 720-KB disks can be read. 720-KB disks can be formatted using the MS-DOS command `FORMAT /N:9/T:80`. 720-KB disks can be written.
- 1.44-MB disks can be formatted, read, and written.

Additional information on disk compatibility and the `FORMAT` command is provided in your *MS-DOS User's Manual*.

4.2 Using Your Keyboard

The keys on the Premium/386C keyboard can be grouped into the following categories (Figure 4-1).

- Typewriter keys
- Function keys
- Cursor-control keys
- Numeric keys

The functions of some keys are the same, regardless of whether you run MS-DOS or an application program. See the documentation for your program for specific key functions.

Notice also the height adjustment feature on your keyboard (Figure 4-2).

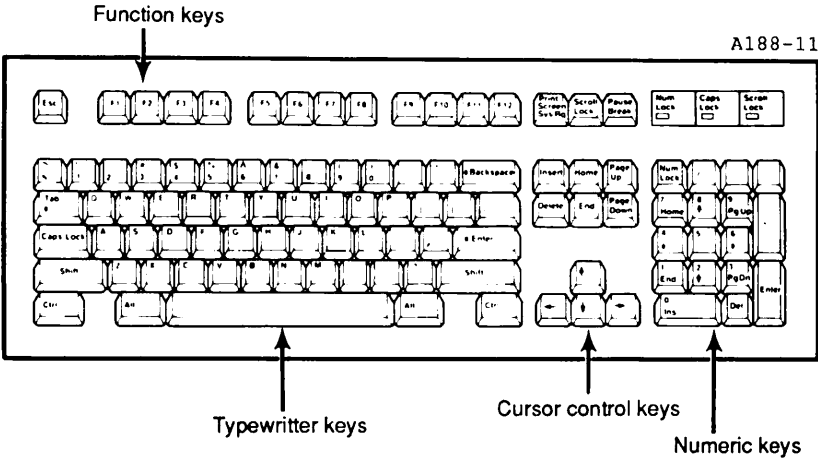


Figure 4-1. Premium/386C Enhanced 101-Key Keyboard.

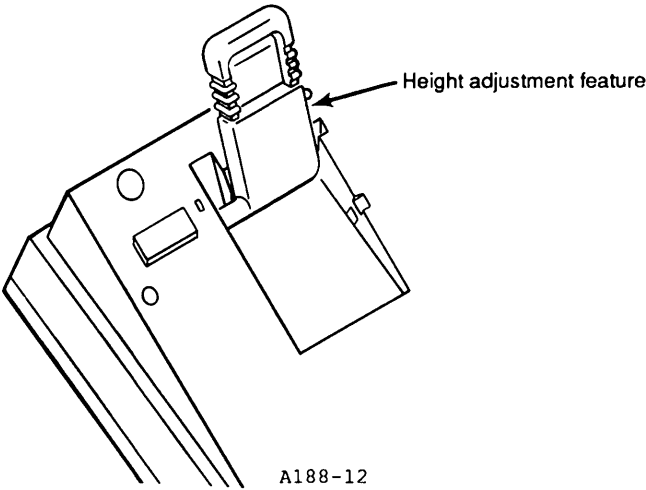


Figure 4-2. Height Adjustment Feature.

4.2.1 Typewriter Keys

The typewriter keys work like the keys on a regular typewriter (Figure 4-3).

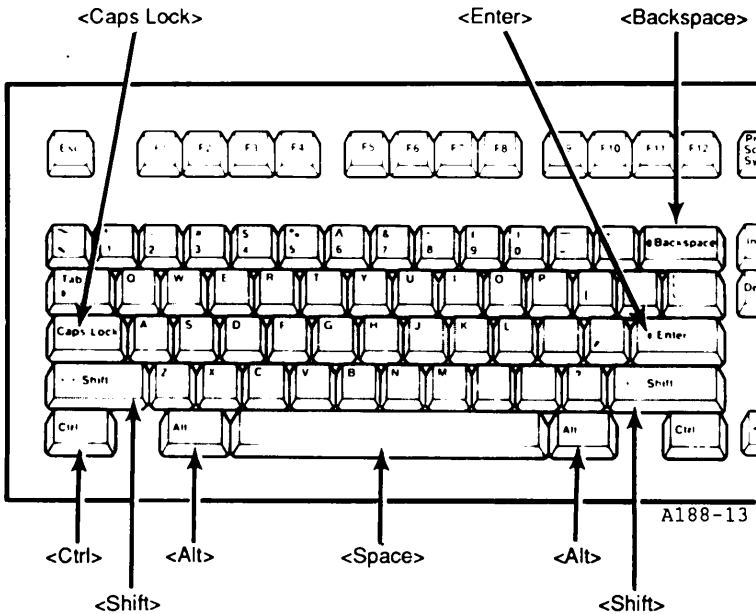


Figure 4-3. Typewriter Keys.

<Enter>

Varies with your application software.

<Space>

Inserts a blank character and advances the cursor (the blinking underscore character) one space to the right.

<Backspace>

Moves cursor one position to the left and erases the character that was in that position, unless otherwise defined by your application program.

<Shift>

Within the typewriter keyboard, shifts letters from lower- to uppercase and numbers to symbols.

Also reverses the effect of <Num Lock> and <Caps Lock>.

<Caps Lock>

Causes letters to appear in uppercase. The caps lock light comes on when <Caps Lock> is in effect. Press <Caps Lock> again to turn off the Caps Lock function and light.

Pressing <Shift> while <Caps Lock> is on causes the letter keys to be entered as lowercase. <Caps Lock> has no effect on the number keys.

<Ctrl>

Used with other keys, performs functions determined by your application program.

Pressing <Ctrl>-<Alt>-<Del> reboots the computer. <Ctrl>-<Alt>-<Up Arrow> increases the computer's operating speed from PC XT to PC AT or 20 MHz. <Ctrl>-<Alt>-<Down Arrow> decreases operating speed.

<Alt>

In conjunction with other keys, performs functions determined by your application program. (Also see "<Ctrl>" above.)

4.2.2 Function Keys

These keys always perform functions determined by your application program (Figure 4-4).

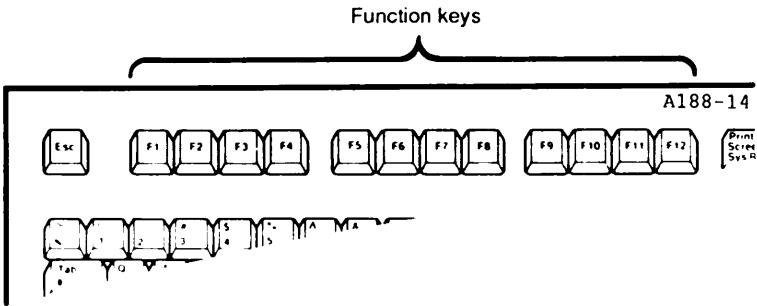


Figure 4-4. Function Keys.

4.2.3 Cursor-control Keys

The cursor-control keys move the cursor in your monitor display (Figure 4-5).

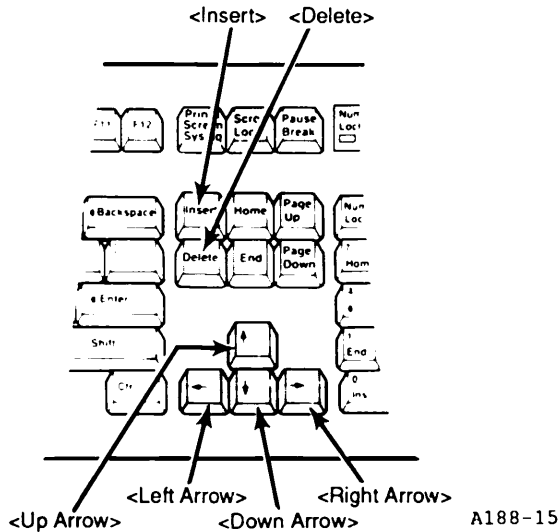


Figure 4-5. Cursor Control Keys.

<Up Arrow>

Moves the cursor up one line. Pressing <Ctrl>-<Alt>-<Cursor Up> increases the computer's operating speed.

<Down Arrow>

Moves the cursor down one line. Pressing <Ctrl>-<Alt>-<Cursor Down> decreases the computer's operating speed.

<Left Arrow>

Moves the cursor to the left one character position.

<Right Arrow>

Moves the cursor to the right one character position.

<Insert>

Varies with your application program. Inserted characters cause previously entered characters to move to the right of the cursor one position for each inserted character.

<Delete>

Deletes the character indicated by the cursor, causing previously entered characters to move left one position for each deleted character, unless otherwise defined by your application program.

4.2.4 Numeric Keys

The numeric keys work like the keys on a calculator. Their arrangement is convenient for entering numerical data (Figure 4-6).

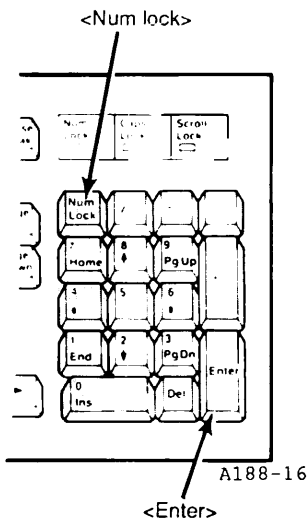


Figure 4-6. Numeric Keys.

<Num Lock>

When in effect, activates numerical and mathematical symbol keys. When you turn on your computer, <Num Lock> is on, and the Num Lock light is lit--unless you disabled <Num Lock> in ASTSETUP.

Press <Num Lock> to turn off the numerical functions and the light. The same keys perform cursor control and other functions defined by your application software.

<Enter>

Varies with your application software.

4.2.5 Changing CPU Speed with Key Combinations

You can set the operating speed of your Premium/386C system to high, medium, or low. The lights on the front of the system unit (Figure 4-7) represent the current operating speed.

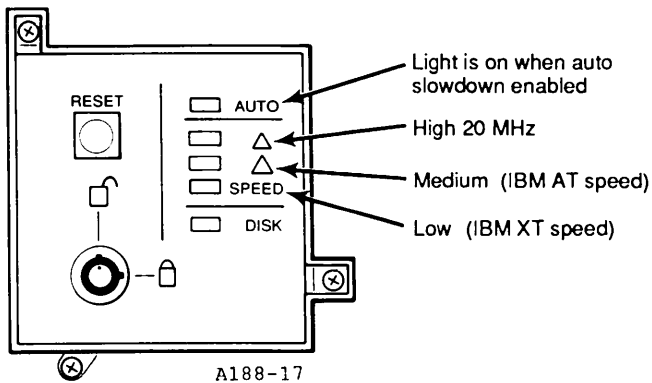


Figure 4-7. Front Panel Lights --CPU Speed.

By changing the system's operating speed, you change how fast the computer can access information and execute commands. You might want to use the low operating speed for time-sensitive software, such as certain game programs. Fast operating speed enables you to run at the peak speed of 20 MHz.

Press <Ctrl>-<Alt>-<Up Arrow> to increase operating speed or <Ctrl>-<Alt>-<Down Arrow> to decrease operating speed.

You may also use SPEED commands (Section 5) or ASTSETUP (Section 3) to change the CPU speed.

NOTE

Certain copy protection routines in application software prevent the application from being loaded when the computer operates at 20 MHz. If your application program does not load properly when the computer is running at 20 MHz, make sure the Auto Slowdown feature is set to Enable in ASTSETUP.

4.2.6 Locking Your Keyboard

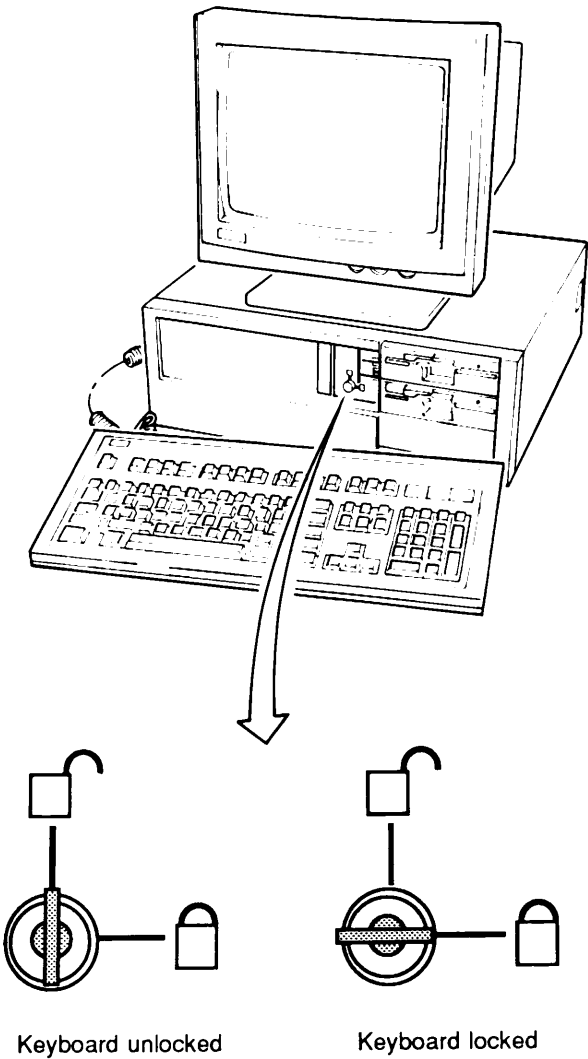
If you lock your Premium/386C keyboard, the keyboard is disabled and will not accept keyboard input.

Premium/386C has two keyboard lock keys. (They are usually attached by a ring to the system's back panel.) Put one away in a safe place in case the other is lost or damaged.

NOTE

Both the keys and keyboard lock must be replaced if both keys are lost. (Contact your authorized AST reseller or AST Technical Support for more information.)

The lock in which the keys fit is located on the front panel (Figure 4-8). You can remove the key from the lock in either position.



A188-18

Figure 4-8. Locking the Keyboard.

4.3 Using a Monitor

Your Premium/386C system is available with an optional AST monitor which can be monochrome, enhanced color, or VGA color. All monitors tilt and swivel to whatever position you choose, and all include an ON/OFF button and adjustable contrast and brightness controls.

To make sure your Premium/386C runs correctly with your monitor and video adapter:

- Make sure the Premium/386C primary video display adapter switch is set correctly. (See Section 2 for details on the switch setting.)
- Make sure all switches, jumpers, and configuration options on your video adapter board are set for the proper monitor type and correct video display modes.
- Make sure the primary video display adapter type is correctly identified in ASTSETUP. (See Section 3 for a detailed explanation of ASTSETUP.)
- Make sure the video display adapter is compatible with the monitor.

4.4 Restarting Your Computer

You can restart your computer in two ways:

- *Warm or soft boot:* Resets the computer, but does not turn the power off and on. Clears RAM. Takes a little less time than a cold boot. Does not include the Power-On Self-Test (POST).

Press <Ctrl>-<Alt>-<Del> to perform a warm boot.

- *Cold or hard boot:* Turns power to the computer off, then on. Includes the POST. Useful if your computer ever "hangs" (won't respond to keyboard input, including <Ctrl>-<Alt>-<Del>).

Press the RESET button on the front panel or turn the system unit power switch off and on to perform a cold boot.

CAUTION

If possible, do not reset the system while a file is open. Doing so erases any data entered since opening the file, and can even corrupt the file (make it inaccessible).

Restarting the system erases any data stored in RAM. If possible, back up RAM data onto a disk before restarting the system.

4.5 Maintaining Your Computer

Follow these guidelines to ensure the best operation of your Premium/386C.

- Set your system on a stable work surface (you can use a space-saving floor stand for the system unit). Avoid dropping or bumping system components.
- Do not eat, drink, or smoke near your computer. If necessary, you can protect system components with covers designed for that purpose.
- Allow proper air circulation to ensure proper cooling. Minimum clearances are:

Rear of system unit:	3 inches (8 centimeters)
Top of display unit:	6 inches (21 centimeters)
Left side of system:	3 inches (8 centimeters)
Right side of system:	6 inches (21 centimeters)

Do not place the system in tight-fitting cabinets, enclosures, and so on.

- Do not set your computer or any attached devices in the sun or near a heater. Excessive heat can damage your computer's components.
- Avoid using your system if a vacuum cleaner is using the same electrical circuit.
- Avoid dust, magnets, and static electricity. These can cause loss of disk data.
- Do not vacuum near disks; it will erase or corrupt disk data.

4.6 Moving Your Computer

This section tells you how to prepare your Premium/386C for moving.

4.6.1 Before You Turn Off the Computer

STEP 1

Save any files you are working on before you turn off your computer.

STEP 2

Remove any disks from the disk drives, and store them in a safe place.

STEP 3

Turn off power to the system unit and monitor.

4.6.2 Preparing for the Move

The following are procedures for preparing your Premium/386C for moving (Figure 4-9).

STEP 1

Remove the system unit power cord from the wall outlet.

STEP 2

Disconnect the system components: Remove the monitor cables from the system unit back panel (and wall outlet, for color monitors). Unplug the keyboard cable from the back panel of the system unit. Check that the five slotted hex screws are securely installed in the back panel.

STEP 3

Put the shipping inserts in the floppy drives to protect the drive heads. (If you did not save the shipping inserts, you can purchase inserts at computer stores.)

STEP 4

Disconnect any other devices attached to the computer.

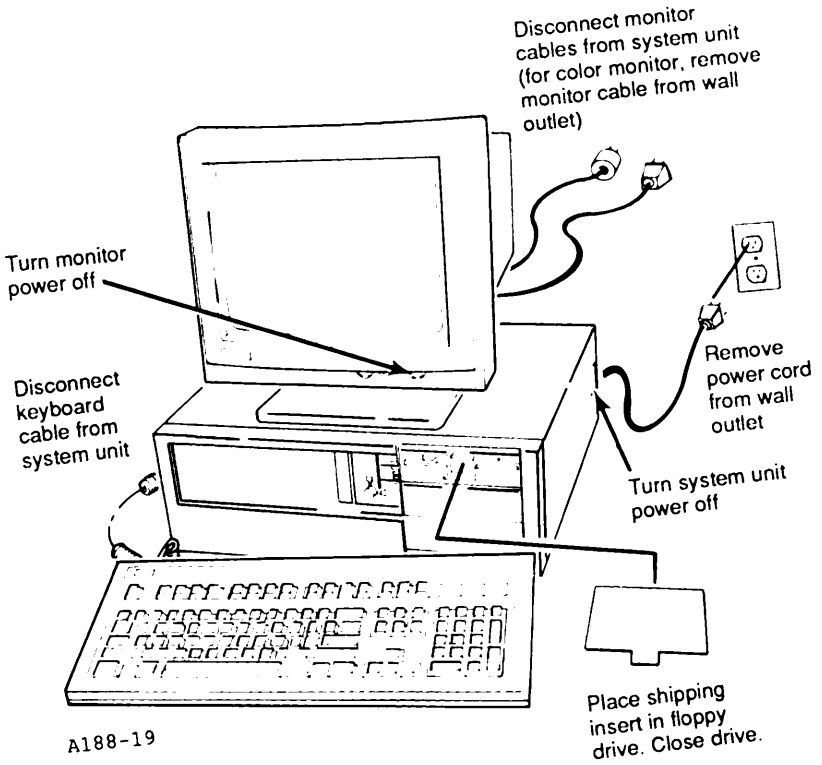


Figure 4-9. Preparing the Computer for Moving.

4.6.3 Packing the Computer

Use the original boxes and packing foam in case you ever move, ship, or store any of the computer's components. The keyboard can be packed separately, or along with the system unit.

NOTE

Do not discard the original Premium/386C packaging, which is custom designed to absorb shock. Units returned for service in nonapproved packaging may be refused and your warranty may be voided. Contact your dealer for replacement shipping containers.

SPEED.EXE is a program that enables you to do the following:

- Change the CPU speed
- Change the auto slowdown feature
- Enable or disable the cache memory

You can perform these functions by entering commands at the DOS prompt. Since SPEED.EXE is provided on your Premium/386C Utility Software Disk, you can copy SPEED.EXE to your fixed disk to have access to the commands all the time. Each of the SPEED commands is shown in this section.

5.1 Changing the CPU Speed

To display the current speed, type the following:

SPEED<Enter>

After you enter the above command, you will see the current speed of the CPU, the condition of auto slowdown, and the current state of the memory cache.

To display the SPEED command options, type the following:

SPEED ?<Enter>

Instructions for using SPEED commands appear.

To change the current speed to the default speed established in ASTSETUP, type the following:

SPEED D<Enter>

To change the current speed to high, type the following:

SPEED HIGH<Enter>

To change the current speed to medium, type the following:

SPEED MED<Enter>

To change the current speed to low, type the following:

SPEED LOW<Enter>

You can also change the CPU processing speed with key combinations. Press <Ctrl>-<Alt>-<Up Arrow> to increase the speed. Press <Ctrl>-<Alt>-<Down Arrow> to decrease the speed.

5.2 Changing Auto Slowdown

SPEED commands can change the auto slowdown feature of the Premium/386C. Auto slowdown automatically reduces the CPU speed during floppy accesses. The slowdown prevents the high CPU speed from disabling some copy-protected programs.

To enable the slowdown feature, type the following:

SPEED AUTO=ON<Enter>

To disable the slowdown feature, type the following:

SPEED AUTO=OFF<Enter>

5.3 Enabling or Disabling the Cache Memory Board

You can enable or disable the cache memory without rebooting your computer and running ASTSETUP by using the SPEED command for cache.

This command is useful if, for example, you need to disable the cache to run diagnostic tests on the standard memory. Once the test is completed, you can use the SPEED command to re-enable the cache without rebooting your computer.

To enable the cache memory board, type the following:

SPEED CACHE=ON<Enter>

To disable the cache memory board, type the following:

SPEED CACHE=OFF<Enter>

NOTES



PART III. APPENDICES

- A. Troubleshooting**
- B. Installing Options**
- C. AST Premium/386C Memory Board**
- D. SMARTslot Architecture**
- E. Serial and Parallel Ports**
- F. Reserved Memory**

NOTES



If you ever have a problem running your Premium/386C system, follow these steps in order:

STEP 1

Consult this appendix for advice on how to handle operating problems or error messages.

STEP 2

Run the system test (contained on the Premium/386C Utility Software disk included with this manual). Remove any device drivers from CONFIG.SYS before running the system test.

STEP 3

If reading this appendix and running the system test do not resolve the problem, contact your authorized AST reseller for technical support.

This section includes the following troubleshooting information:

- **Operating problems:** What to do when you have problems running your computer (Appendix A.1).
- **Error messages:** What to do about messages, including messages communicated via beeps and text messages displayed on your screen (Appendix A.2).
- **System Test:** How to run the system tests contained on the Premium/386C Utility Software disk (Appendix A.3).

A.1 Operating Problems

This section tells you what to do if you ever have problems running your system. If any problem persists after you take corrective action, contact your authorized AST reseller for assistance.

PROBLEM

The computer does nothing when you turn it on.

ACTION

Make sure everything is plugged in. Check that the voltage setting (on the back panel of the system unit) is correct for your location. Try turning on the computer again.

PROBLEM

The monitor does not display anything when you turn on the system.

ACTION

Make sure you turned on the monitor power knob (at the front of the monitor). Make sure the brightness knob (at the front of the monitor) is correctly adjusted.

Make sure the monitor power cable is properly installed and the video cable is attached to the graphics adapter. (For monochrome monitors, the power cord goes into the connector at the back of the system unit. For color monitors, the power cord goes to a grounded wall outlet.)

If the monitor still does not display anything, open the system unit and make sure your video adapter board is properly installed. Check the switch and jumper settings on the board. Refer to the manufacturer's instructions for details.

PROBLEM

The monitor displays a cursor, but nothing happens when you press the keyboard keys.

ACTION

Make certain that the keyboard is unlocked. Verify that the cable between the keyboard and the rear panel of the system unit is properly installed.

PROBLEM

Your monitor display flashes or waves.

ACTION

Make sure the cables between the monitor and the rear panel of the system unit are properly installed. Make sure the switches and jumpers on the video adapter board are set correctly.

PROBLEM

Your monitor displays this message when you boot up your computer:

EQUIPMENT CONFIGURATION ERROR -- RUN SETUP

ACTION

Run ASTSETUP as described in Section 3, and save any new configuration information.

PROBLEM

Pressing the <Caps Lock>, <Num Lock>, or <Scroll Lock> keys does not light the corresponding lights on the keyboard. Pressing <Ctrl>-<Alt>-<Up Arrow> or <Ctrl>-<Alt>-<Down Arrow> does not change the operating speed lights on the front of the system unit.

ACTION

Make sure the keyboard cable is properly installed between the keyboard and the connector on the back panel of the system unit.

PROBLEM

A floppy disk drive you installed in the system does not work correctly.

ACTION

Make sure you run ASTSETUP whenever you add or remove a floppy drive. Use the firmware version of ASTSETUP, accessed by pressing any key during POST, to enable the floppy drive.

If the drive still does not work correctly, open the system unit and make sure the cable is properly installed between the disk drive and the system board. Make sure the drive power cable is attached correctly and the signal cable is not backward. Also verify that the system board floppy controller pins are connected correctly.

If it is your second floppy drive, make sure the terminator has been removed. Usually, the terminator is a resistor pack. Refer to the drive manufacturer's instructions for the location of the terminator and the proper configuration of the drive.

PROBLEM

A fixed disk you installed in the system does not work correctly.

ACTION

Make sure you run ASTSETUP to set the fixed drive type. If the drive still does not work correctly, open the system unit and make sure cables between the fixed disk drive and the disk controller board (the circuit board closest to the disk drives) are properly installed. Also check for proper power cable attachment. If you installed the fixed disk yourself, check the manufacturer's instructions to make sure the drive is properly configured and that the partition is active.

PROBLEM

A serial or parallel device attached to the serial or parallel ports on the rear panel of the system unit does not work properly.

ACTION

Make sure the attached device is turned on, and the cable is properly installed between the device and the port. Make sure the port is enabled in ASTSETUP.

For serial devices, set the serial port to use the same parameter values as the attached device (baud rate, parity, data bits, start bits, and stop bits). If you are using MS-DOS, you can use the MODE command to set these parameters. See the manufacturer's documentation for the serial device for the correct parameter values.

If the device still does not work, check the serial or parallel port pinouts for the computer (see Appendix E) and the device (see the manufacturer's documentation). The pinouts for the port must match those for the attached device.

PROBLEM

Certain software programs do not work properly.

ACTION

Make sure the Auto Slowdown feature in ASTSETUP is enabled.

Try installing and running the programs at a slower speed. Certain copy-protected programs will not boot at medium or high speed. Also, some programs are not written to run at faster clock speeds. Press <Ctrl>-<Alt>-<Up Arrow> or <Ctrl>-<Alt>-<Down Arrow> to change the operation speed. The current speed is indicated by the lights on the front panel of the system unit. If necessary, change the default operating speed of your computer.

PROBLEM

You have 4 MB of memory installed but the system only recognizes 3 MB and no error message is displayed..

ACTION

Verify that the memory board switch bank is set correctly. If the switches are correct, check the SIMMs in the last bank by swapping them with SIMMs in the third bank. Contact your authorized AST reseller for assistance.

A.2 Error Messages

Error messages appear when the Power On Self Test (POST) has failed. POST is a series of programs that test your system components. POST runs automatically when you turn on your system. There are two kinds of error messages:

- *Text messages* display information on the screen.
- *Beep codes* communicate an error condition by beeps.

A.2.1 Text Messages

When an error is detected during POST, an error message and the following prompt appear:

PRESS F1 KEY TO CONTINUE
OR CTRL-ALT ESC FOR SETUP...

At the prompt, you can press <F1> and continue normal processing, or you can press <Ctrl>-<Alt>-<Esc> and rerun ASTSETUP.

The following text messages may appear during POST.

CMOS RAM ERROR, CHECK BATTERY/RUN SETUP

Explanation: CMOS has been corrupted.

Action: This message appears intermittently near the end of the battery's life cycle. Check the system battery. Make sure it is properly installed and replace it if discharged. Rerun ASTSETUP.

**CHECKING UNEXPECTED INTERRUPTS AND STUCK NMI...
FAILED**

Explanation: The system board has a problem.

Action: Contact your AST reseller for assistance.

**DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS
ENTER**

Explanation: The computer could not find the required system files on the boot disk.

Action: Retry the boot with a different system disk in drive A. Run ASTSETUP and make sure your drives are configured correctly.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

Explanation: The fixed disk, the controller board, or the cable from the board to the fixed disk might not be properly installed. The fixed drive type may be incorrectly identified in ASTSETUP. The drive may be incorrectly formatted.

Action: Rerun ASTSETUP and verify the Disk 1 and Disk 2 fields. Retry the disk access. If necessary, reseal the fixed disk controller board in its expansion slot. Reattach both ends of the disk controller board cable. Retry the disk access.

If the message appears the first time you boot after installing a fixed disk, the disk may have been formatted incorrectly.

ERROR INITIALIZING HARD DISK CONTROLLER

Explanation: The fixed disk controller board or the cable from the board to the fixed disk may not be properly installed.

Action: Retry the disk access. If necessary, reseal the fixed disk controller board in its expansion slot. Reattach both ends of the fixed disk controller cable. Retry the disk access.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Explanation: There is no floppy disk controller present, the controller is not configured correctly, or the controller is disabled in ASTSETUP.

Action: Verify the Onboard Floppy Controller field in ASTSETUP; it should be ENABLED. Retry the disk access. Reattach both ends of the controller cable. Retry the disk access.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Explanation: POST is unable to verify the keyboard functions.

Action: Be sure the keyboard cable is properly installed between the keyboard and the system unit, and that none of the keys are jammed.

MEMORY ADDRESSING ERROR AT NNNN

MEMORY ERROR AT NNNN

WROTE 0A5A5 BUT READ NNNN

Explanation: POST is unable to verify the memory in your computer.

Action: Turn off your computer. Make sure single inline memory modules (SIMMs) are properly installed on the Premium/386C memory board. Reseat the memory boards.

MEMORY SIZE ERROR -- RUN SETUP

Explanation: The amount of memory found by POST is different than the amount defined in ASTSETUP.

Action: Run ASTSETUP and correctly define the amount of conventional and extended memory.

PARITY ERROR IN SEGMENT NNN

Explanation: POST is unable to verify the memory in your computer.

Action: Turn off your computer. Make sure SIMMs are properly installed on the Premium/386C memory board. Reseat the memory board.

RAM PARITY ERROR. CHECKING FOR SEGMENT ADDRESS...

followed by either:

OFFENDING ADDRESS NOT FOUND or OFFENDING SEGMENT:NNNN

Explanation: POST is unable to verify the memory in your computer.

Action: Turn off your computer. Make sure SIMMs are properly installed on the Premium/386C memory board. Reseat the memory board.

REAL TIME CLOCK ERROR

Explanation: The real-time clock is not operating as expected.

Action: Replace the system battery and run ASTSETUP to reconfigure the system.

REFRESH TIMING ERROR

Explanation: An error has occurred during the system board test.

Action: Call your AST reseller for assistance.

SETUP CONFIGURATION ERROR - CACHE NOT FOUND

Explanation: The cache board is not installed. This message indicates the computer is not set up correctly; that is, CMOS believes the board is installed, even though there is no cache board in the computer.

Action: If you do not have the cache board, press <F1> to continue. You can contact your authorized AST reseller to purchase the cache board for your computer.

If you have removed the cache board from your computer, disable the cache in ASTSETUP, or ignore this message and press <F1> to continue.

SYSTEM KEY IS IN LOCKED POSITION -- KEYBOARD IS
LOCKED OUT

TURN KEY TO UNLOCKED POSITION

Explanation: Keyboard is locked.

Action: Turn the system key in the front panel lock to
the unlock position.

TESTING CACHE ... CACHE MEMORY FAILED

Explanation: Cache memory failed verification during
cache testing.

Action: Call your AST reseller for assistance.

TESTING CMOS BATTERY...FAILED

Explanation: The system battery level is low.

Action: Replace the system battery and run
ASTSETUP to reconfigure the system.

TESTING CMOS CHECKSUM...FAILED

Explanation: The ASTSETUP file is corrupted or the
system battery level is low.

Action: Replace the system battery and run
ASTSETUP to reconfigure the system.

TESTING MEMORY.....nnnn

Explanation: This is an informational message. *nnnn* is
the number of KB of functional RAM.

Action: None required.

TESTING INTERRUPT CONTROLLER #n ...FAILED

Explanation: The system board has a problem.

Action: Call your AST reseller for assistance.

TESTING PROCESSOR EXCEPTION INTERRUPTS...FAILED

Explanation: The system board has a problem.

Action: Call your AST reseller for assistance.

**WARNING! ON BOARD PARALLEL PORT IN CONFLICT WITH
OPTION CARD PARALLEL PORT SELECTION**

Explanation: An add-in board parallel port is using the same address or name as a built-in parallel port.

Action: Change the configuration of the option board parallel port, or run ASTSETUP to change or disable the built-in parallel port.

**WARNING! ON BOARD SERIAL PORT IN CONFLICT WITH
OPTION CARD SERIAL PORT SELECTION**

Explanation: An add-in board serial port is using the same address or name as a built-in serial port.

Action: Change the configuration of the option board serial port, or run ASTSETUP to change or disable the built-in serial port.

A.2.2 Beep Code Messages

Beep code messages (Table A-1) are a series of beeps reporting errors detected during POST. For example, you might hear one long beep, followed by one short beep. When you hear a beep code, write it down. Make sure the device the beep code has indicated is properly connected to your system. If necessary, contact your authorized AST reseller for assistance.

Table A-1. Beep Codes.

Beeps		Check this Component
Long	Short	
0	1	System board
0	3	System board
0	4	System board
0	5	System board
0	7	System board
0	9	System board
0	11	System board
0	12	System board
0	13	System board
0	14	System battery
0	15	System board
1	0	System board
1	1	System board
1	2	System board
1	3	System board
1	4	System board
1	5	Memory board
1	7	Memory board
1	8	Video board

A.3 Running the System Test

If, after reading Sections A.1 and A.2, you are unable to resolve a problem, your next step is to run the system test. The system test runs tests on the hardware modules installed in the system. None of the tests require your intervention once they begin. The tests take a limited amount of time, and do not destroy any information stored in your computer or on disk. The system test for the Premium/386C is on the Utilities disk that comes with this manual.

To run the system test, boot computer with a working copy of your MS-DOS floppy disk. The disk should not contain a CONFIG.SYS file or any terminate and stay resident (TSR) programs.

Insert a working copy of the Utility Software disk into drive A, type the following:

A:ASTMENU

The AST common user interface, ASTMENU, appears. Choose the Run System Test option.

NOTE

Make sure that you delete all device drivers from your CONFIG.SYS file before running the test.

The test first senses all components and then asks you to press any key to continue. Verify that it has sensed all Premium/386C components, and then press any key to continue with the test. If you get an error during the System Test, an error message appears on your screen. Write down the message and contact your authorized AST service center.

If you are trained to service computers, you can purchase the Hardware Maintenance Kit for the Premium/386C from your local reseller. The kit includes a detailed maintenance manual and sophisticated diagnostics.

This section explains how to open your Premium/386C system unit and install popular additions such as add-in boards, math coprocessors, floppy drives, and fixed disk drives. Although it is easy to do, you only need to open the system unit if:

- You are installing or reconfiguring a board in your computer.
- You want to add some other internal option, such as a disk drive or math coprocessor.
- You are setting the system for the primary adapter that you will be using (color or monochrome).

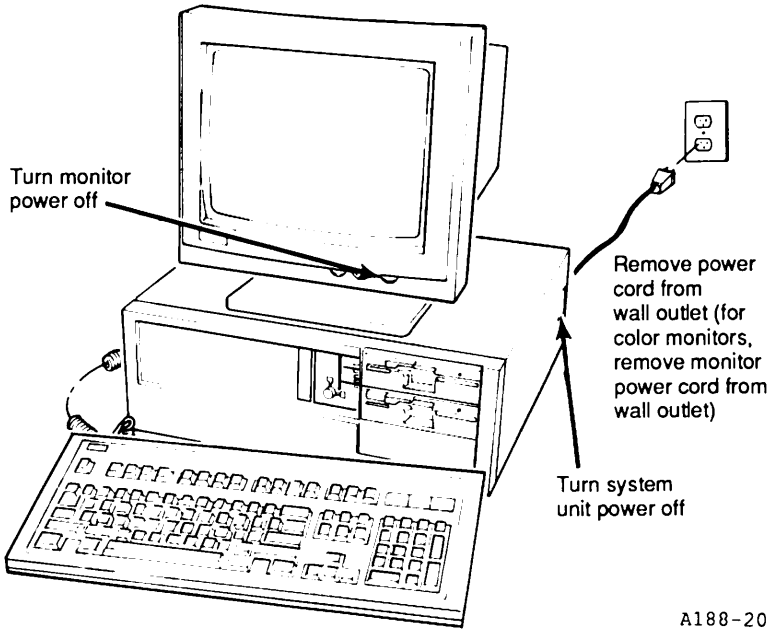
B.1 Installing an Add-in Board

Follow this procedure to open the Premium/386C system unit and install an add-in board.

STEP 1

Turn power off. Be sure the computer's power switch is off and the power cord is removed from the wall outlet (Figure B-1).

Turn off any other equipment connected to the computer. Installing any component while the computer is on can permanently damage your computer and its components.



A188-20

Figure B-1. Turning Off the Computer.

STEP 2

Disconnect computer components. Disconnect the components of your Premium/386C system (Figure B-2). Also disconnect any other devices plugged into your system.

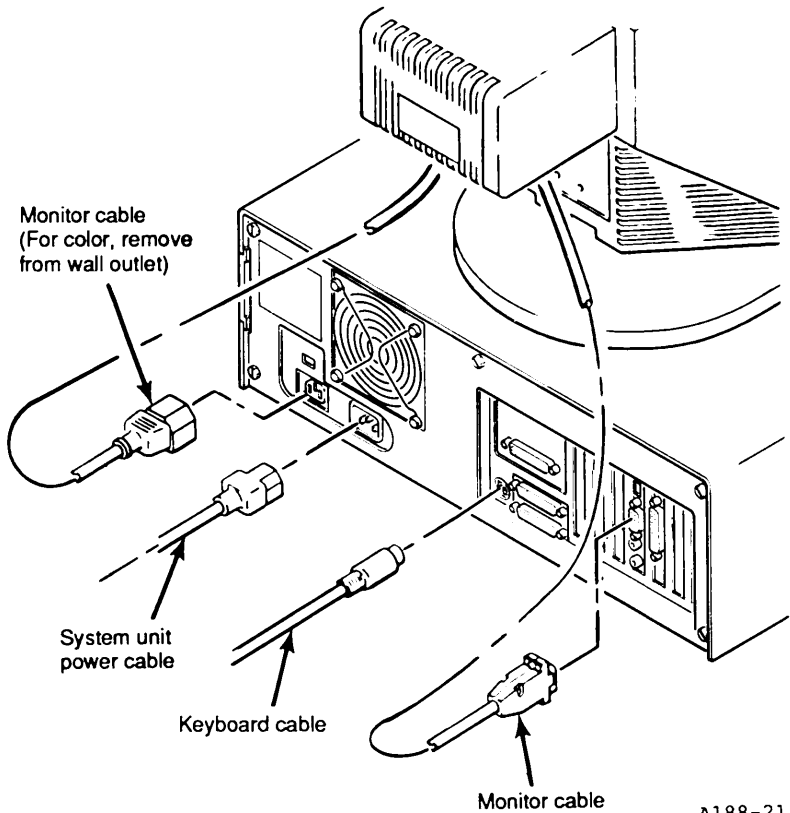


Figure B-2. Disconnecting Computer Components.

STEP 3

Remove back panel screws. Use a hex nut driver or a flathead screwdriver to remove the five slotted hex screws from the back panel (Figure B-3).

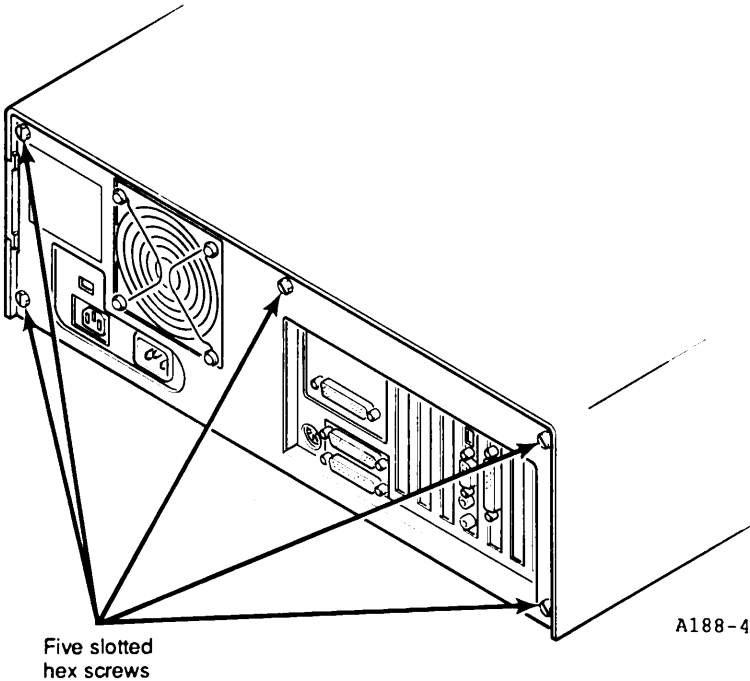


Figure B-3. Removing Back Panel Screws.

STEP 4

Remove the system unit cover. Slide the cover about 2 inches past the on/off switch. Lift the cover straight up, off the unit (Figure B-4).

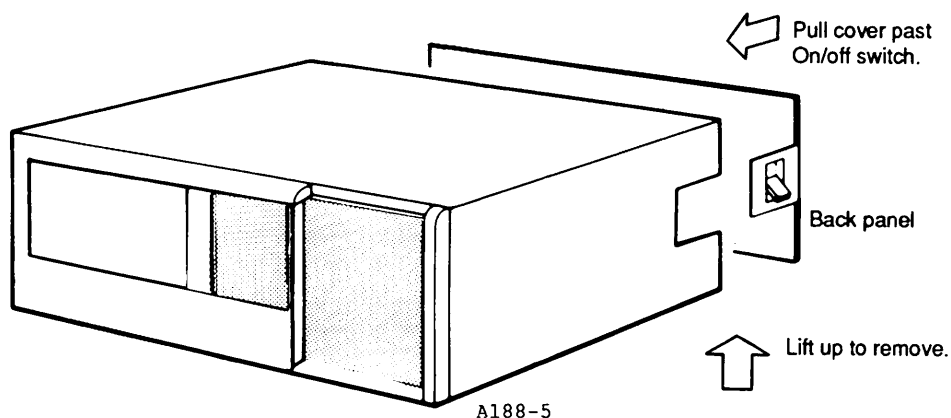


Figure B-4. Removing the System Unit Cover.

STEP 5

Select an unused expansion slot. There are seven expansion slots on the Premium/386C system board (Figure B-5).

Slot 1 is a 32-bit slot dedicated to the Premium/386C memory board. Slot 1 cannot be used for any other board.

Slots 2 and 3 are standard PC XT expansion slots. One-connector (8-bit) boards should be put in these slots. If slots 2 and 3 are filled, one-connector boards may be placed in any unused slot.

Slot 4 is a standard PC AT, 8/16-bit expansion slot. One-connector (8-bit) or two-connector (8/16-bit) boards can be placed in this slot. If slot 4 is filled, two-connector boards may be placed in slots 5 through 7.

Slots 5 through 7 are AT-compatible SMARTslots. SMARTslots are extended versions of the standard, AT expansion slot providing high-performance, multimaster capability. Boards that use the SMARTslot Architecture must be placed in slots 5 through 7. If desired, you can seat either a XT- or AT-compatible board in a SMARTslot. (Additional information on SMARTslot Architecture is provided in Appendix D.)

NOTE

The J numbers (J1, J2, J3, etc.) on the Premium/386C system board do *not* correspond with the expansion slot numbers used in this manual. For example, slot 1 (Premium/386 C memory board) is labeled J7 on the system board.

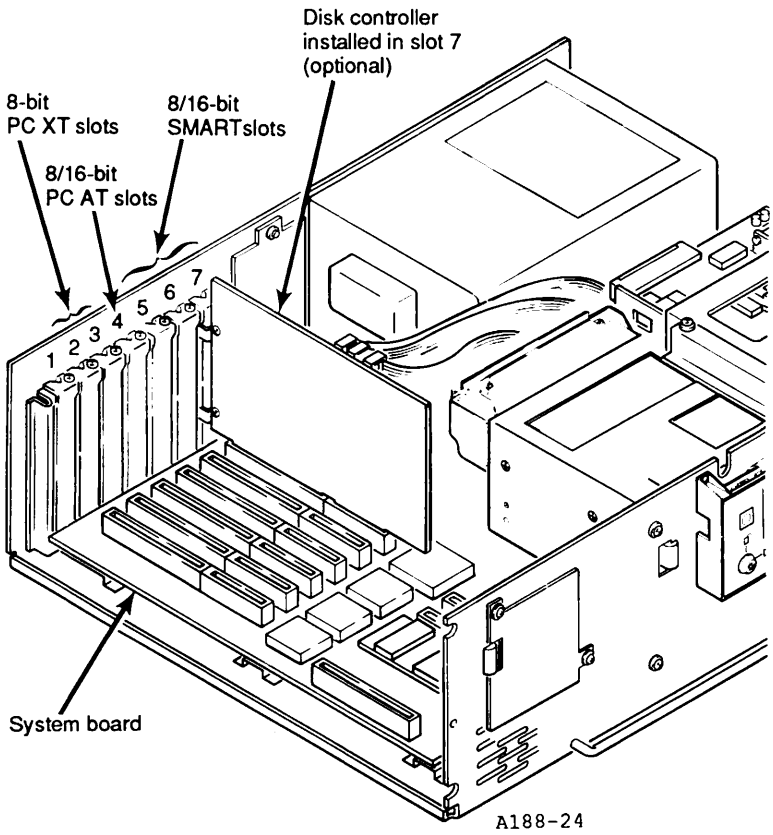


Figure B-5. Choosing an Expansion Slot.

STEP 6

Remove expansion slot bracket. Locate the bracket for the selected expansion slot (Figure B-6). Remove and save the bracket retaining screw. Pull out the bracket.

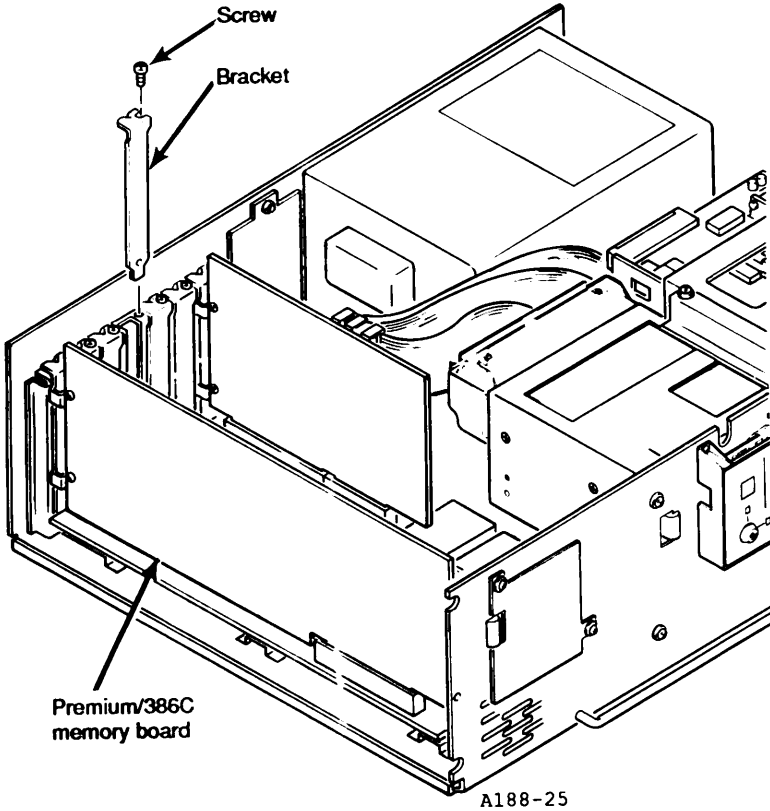


Figure B-6. Removing an Expansion Slot Bracket.

STEP 7

Install the board. Line up the board with the expansion slot. Lower the board until each of its edge connectors rests on an expansion slot receptacle. Using evenly distributed pressure, push the board straight down until it seats in the expansion slot (Figure B-7).

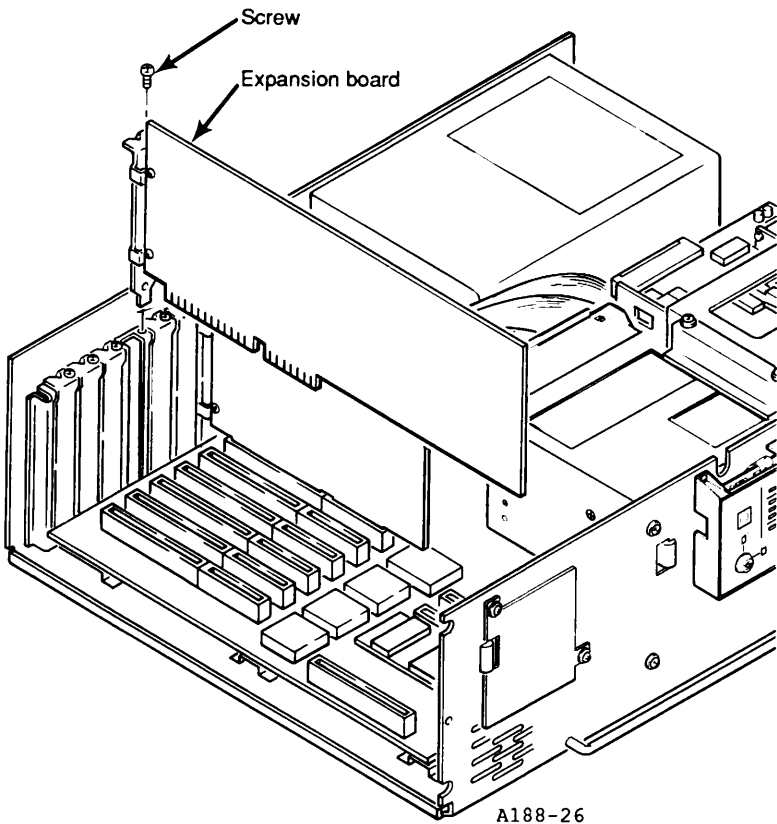


Figure B-7. Installing a Board.

STEP 8

Secure the board to the chassis. Reinstall the bracket retaining screw you removed earlier.

STEP 9

Replace the system unit cover. Place the cover in front of the ON/OFF switch. Lower the cover. Gently push it back until it stops securely against the rear panel. Reinstall the five slotted screws you removed earlier.

STEP 10

Reassemble the system components. After you have reconnected all of the computer components, you can turn on the system.

B.2 Installing a Math Coprocessor

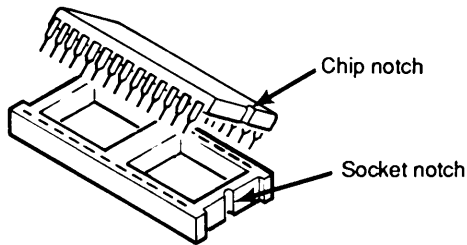
Math coprocessors are specialized chips that perform arithmetic, logarithmic, and trigonometric functions. They are coprocessors because they offload work from the microprocessor. However, not all application software programs support a math coprocessor, and some programs may need to be configured specifically to support the coprocessor.

You can use *either* an 80287 or 80387 microprocessor chip in your Premium/386C. (Although you can install both chips on the board, you cannot use both chips simultaneously. You must enable either the 80287 or 80387 in ASTSETUP.) If you use an 80287 chip, it should be rated for a clock speed of 8 MHz. If you use an 80387 ship, it should be rated for a clock speed of 20 MHz.

The Premium/386C system board has two coprocessor sockets, one for a 80287 chip (U32) and one for a 80387 chip (U33) (Figure B-9).

When installing a math coprocessor, be sure you have correctly lined up the edge with the pins before pressing down firmly to secure the chip (Figure B-8).

After installing the math coprocessor, you *must* run ASTSETUP to enable and identify the coprocessor. (Refer to Section 3 for instructions on running ASTSETUP.)



A179-2

Figure B-8. Lining Up the Coprocessor Chip.

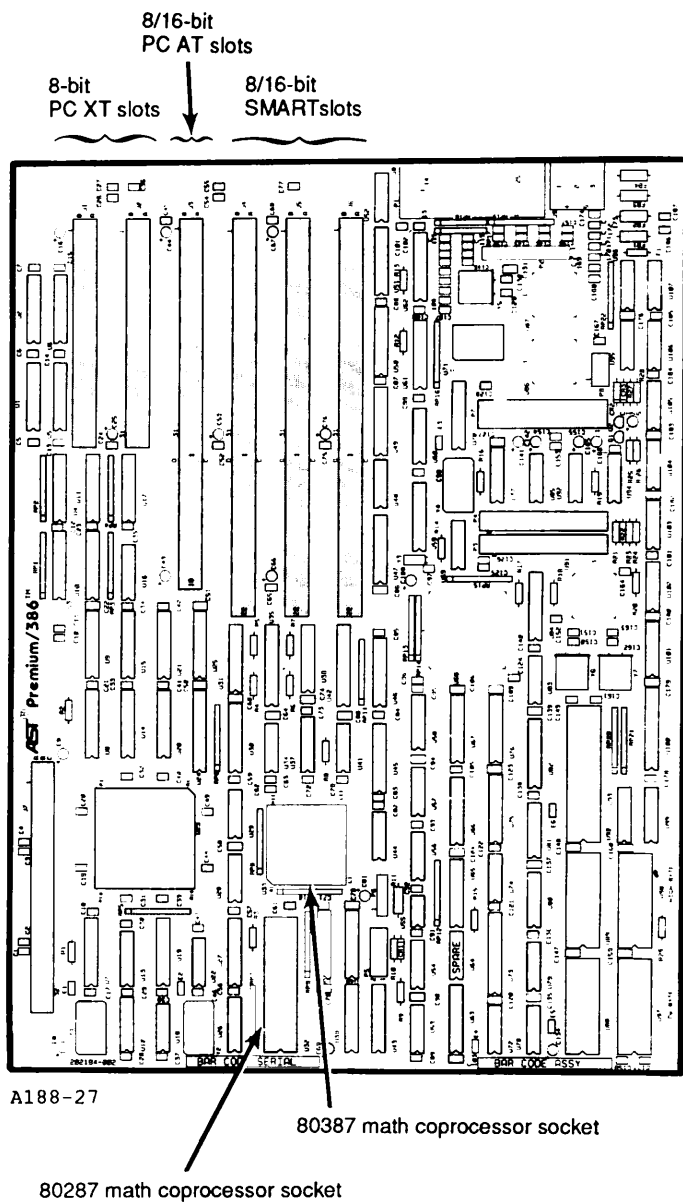


Figure B-9. Locating the Math Coprocessor Sockets.

B.3 Adding Drives

You or your AST reseller can add or remove floppy drives, fixed drives, or tape drives to your Premium/386C. In its minimum configuration, the system comes with a single floppy drive.

Adding a first or second drive involves:

- Installing hardware (Section B.3.1)
- Running ASTSETUP (Section 3)
- Formatting and partitioning -- fixed drives only (Section B.3.2)

If you want to add a third floppy device, see Section B.3.3 for procedures.

B.3.1 Installing the Drive

Drives can be installed in either the right or left cage of your Premium/386C (Figure B-10).

CAUTION

If you have an ESDI fixed disk controller, you *must* add ESDI format fixed disk drives. AST's 90-MB, 150-MB, and 320-MB drives are ESDI format.

Floppy disk drives (3.5-inch or 5.25-inch) and tape drives must be installed in the right cage.

Fixed drives are usually installed in the left cage, but may be installed in the right cage if there is room. You can install full- or half-height fixed disks including fast access, fixed disks in 40-, 70-, 90-, 150-, and 320-MB capacities from AST.

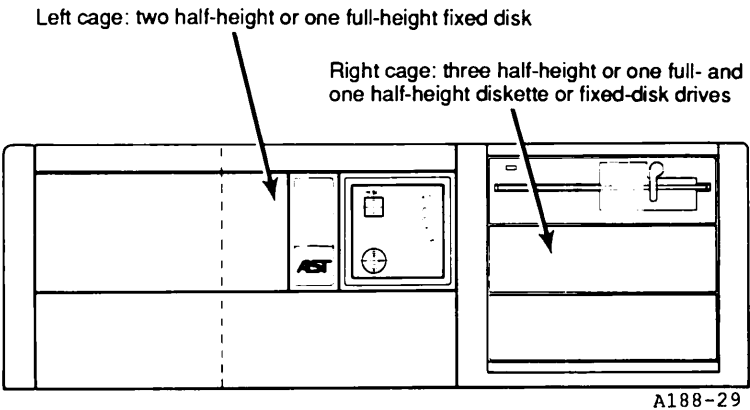


Figure B-10. Full- and Half-Height Disk Drives.

As you install drives, keep the following in mind:

- Install drives qualified for installation in your Premium/386C. Your reseller can supply the most current information on qualified drives.
- Each floppy drive must be connected to three cables: a disk controller ribbon cable, a power cable, and a ground wire (Figure B-11).

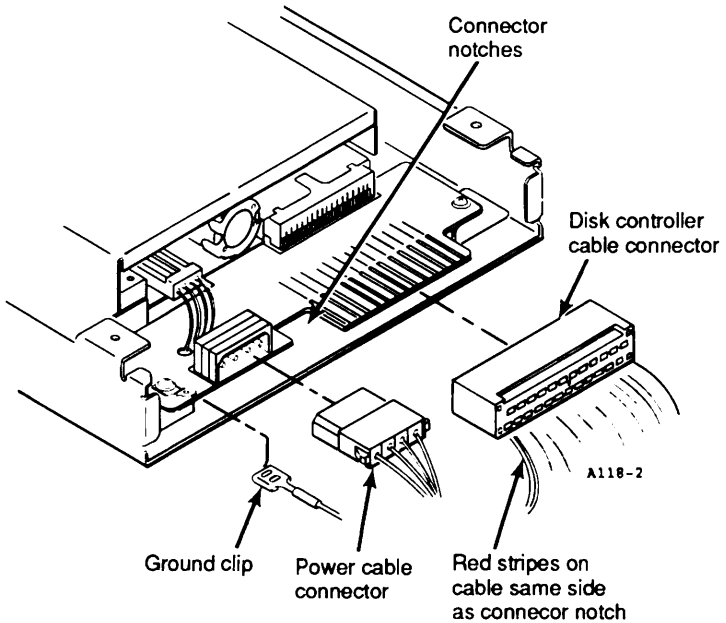


Figure B-11. Floppy Drive Cabling.

- Each fixed disk drive must be connected to four cables: a disk controller ribbon cable, a data ribbon cable, a power cable, and a ground wire (Figure B-11).

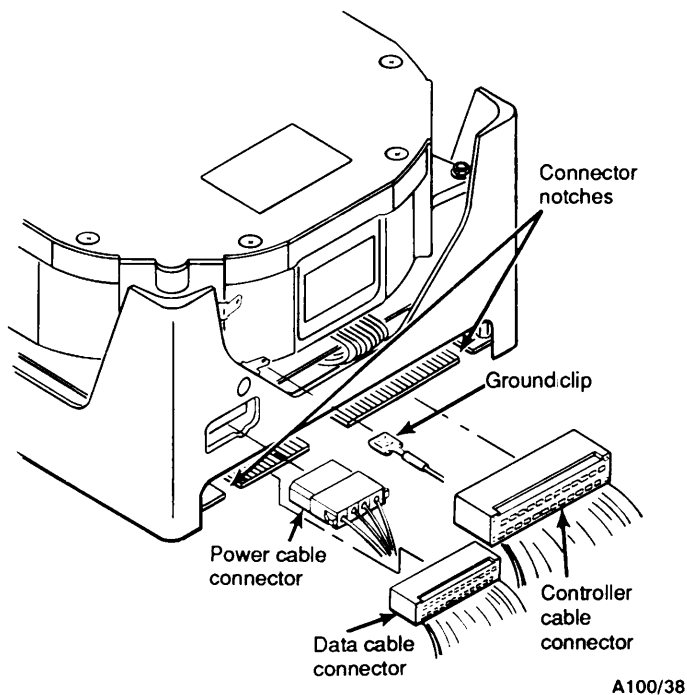


Figure B-11. Fixed Disk Drive Cabling.

- All ribbon cables are constructed to ensure proper installation on the disk drive edge connectors. The red stripe on the ribbon cable should be closest to the notch on the edge connector. If the cable connector does not fit easily on the edge connector, check that the red stripe is in the correct position. Do *not* force the cable connector.

Before installing any drive, check the hardware configuration. Drives (floppy, fixed, and tape) include a terminating resistor and a drive select (their locations and configuration should be described in the manufacturer's documentation).

Terminating resistor: Remove the terminating resistor if the drive you are installing is the *second* floppy or fixed disk. (The *first* drive of either type should have a terminating resistor installed.) Remove the terminating resistor from all tape drives.

Drive select: Place the drive select at "DS1" on floppy disk drives and "DS2" on fixed disk and tape drives.

Right-Cage Installation

Before installing a floppy or fixed drive, note its capacity in MB. If you're installing a fixed drive, also write down the drive type number (usually on a sticker) and remove the defect list (if any) from the drive.

STEP 1

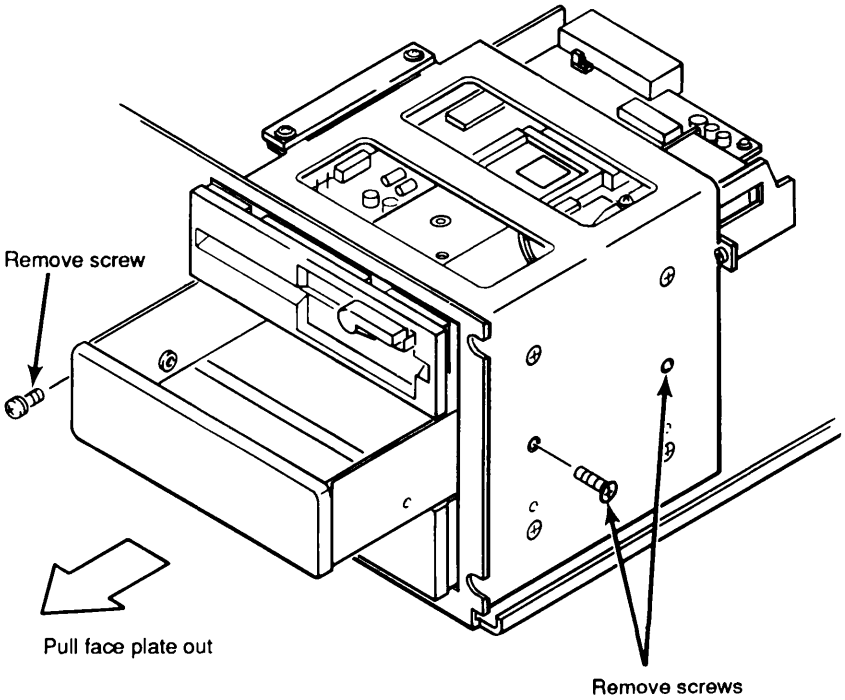
Turn the power off and disconnect computer components.

STEP 2

Remove the Premium/386C cover.

STEP 3

Remove the screws securing the face plate to the front panel of the Premium/386C (Figure B-13). Remove one plate to make room for a floppy disk, tape, or half-height fixed disk drive. Remove two plates for a full-height fixed disk drive.



A100B-6

Figure B-13. Removing the Face Plates.

STEP 4

Remove the two screws securing the side bracket to the face plate (Figure B-14). Pull the bracket off the face plate. Place the bracket at the same location on the new drive. Install the bracket screws.

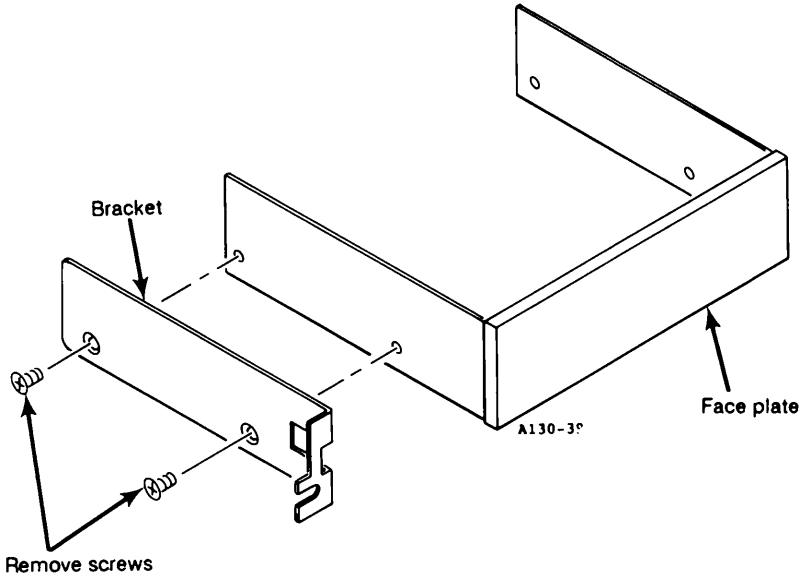


Figure B-14. Removing the Face-Plate Bracket.

STEP 5

Insert the drive; slide the drive into the opening (Figure B-15). Hold the drive in place as you install the screws securing it to the system chassis.

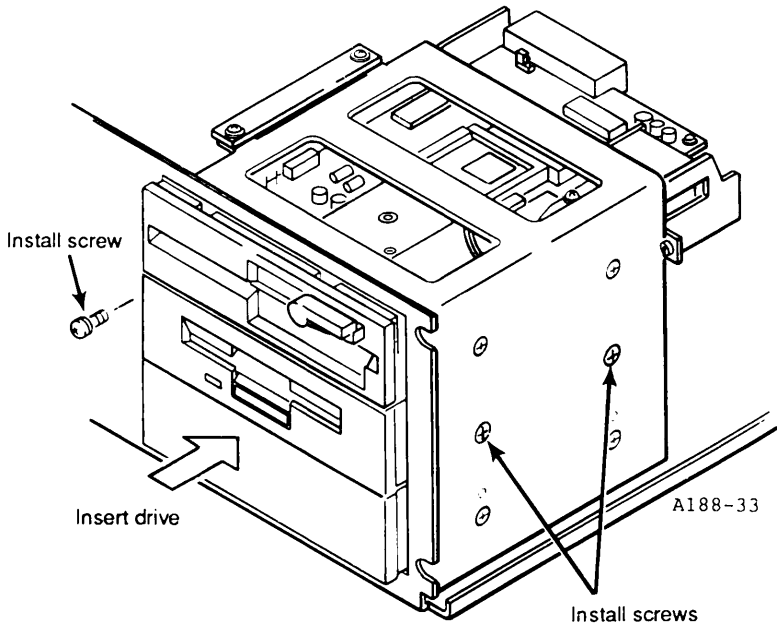


Figure B-15. Inserting the Drive.

STEP 6

Unplug the dummy load and remove the left disk cage. If a fixed disk drive is installed in the left cage, skip to Step 8.

If you are installing a fixed disk drive, unplug the power connector from the dummy load in the left cage. The dummy load is the metal box connected to the power supply inside the left cage. (It keeps a minimum draw on the power supply.)

STEP 7

Cable the drive: Verify the drive configuration. Connect the power cable to the drive. Select the proper data and controller cables (Figure B-16). Be sure the red stripe on these cables is on the same side as the connector notches.

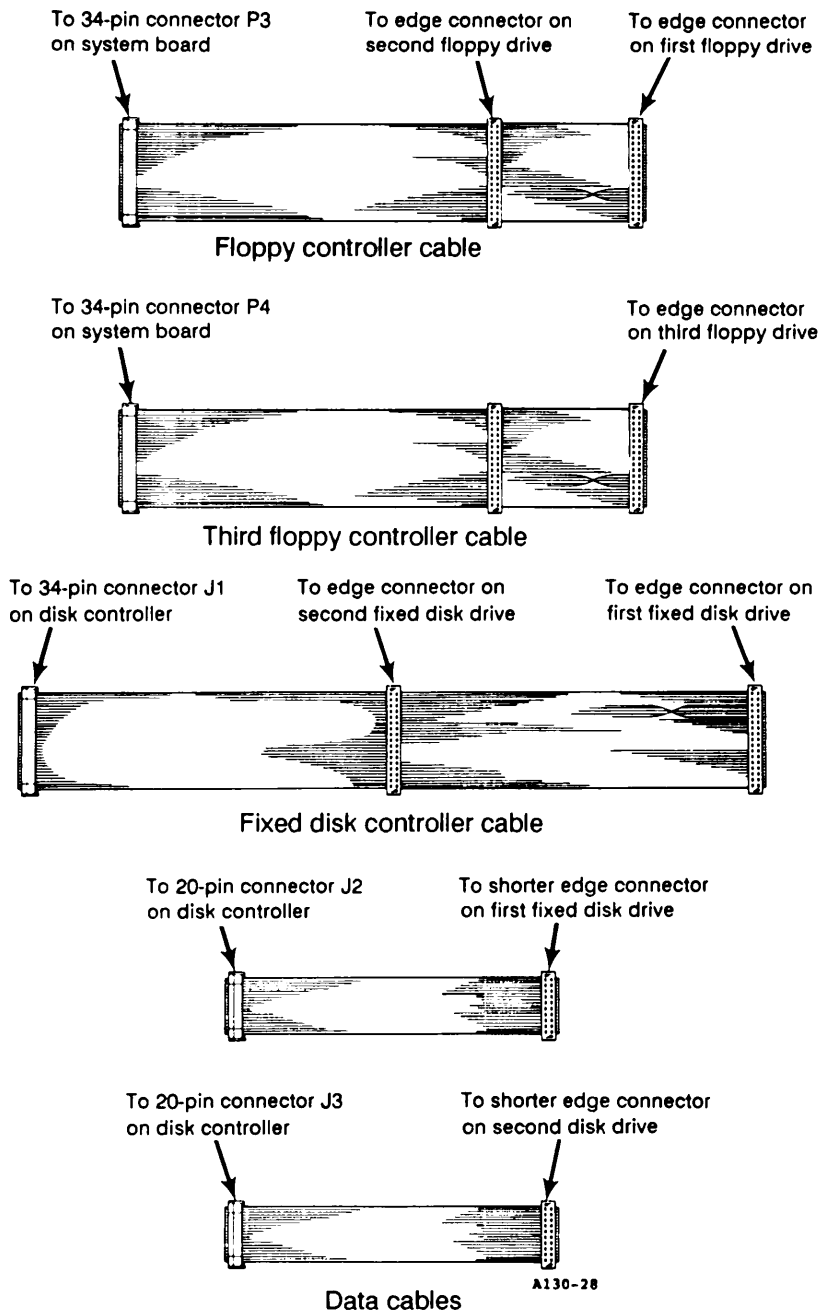


Figure B-16. Cabling Summary.

STEP 8

Connect the ground wire from the right side of the cage to the device.

STEP 9

Replace the system unit cover.

STEP 10

Reconnect computer components and power on the system.

STEP 11

Run ASTSETUP. Instructions for running ASTSETUP are provided in Section 3. (You don't have to run ASTSETUP if you installed a tape drive.)

STEP 12

You may need to format and partition a fixed disk. Refer to Section B.3.2 for additional instructions.

Left-Cage Installation

Only fixed disks are installed in the left cage. Before installing a fixed disk drive, write down the disk type. Remove and save the drive defect list, one is attached to the drive.

STEP 1

Turn the power off and disconnect computer components.

STEP 2

Open the system unit and remove the Premium/386C cover.

STEP 3

Remove the left disk cage; unplug the power connector from the dummy load, if it has not been removed. (The dummy load is the metal box inside the left cage.)

Remove the screws from the top cage bracket. Support the cage by holding the bottom. Remove the screws, lockwashers, and washers securing the cage to the front of the chassis. Carefully lift out the cage.

STEP 4

Remove the dummy load, if there is one; remove the five screws securing the dummy load to the disk cage. Pull the dummy load out of the cage and set it aside.

STEP 5

Install fixed disk drive; remove the face plate from the fixed disk, if there is one. Make sure the drive select is set to DS2. If this is your second fixed disk, also make sure the terminating resistor has been removed.

Slide the drive into the empty cage. Connect the 34-pin, disk controller cable connector and the 20-pin, data cable connector to the drive's edge connectors. Connect the other end of each cable to the controller.

Secure the drive to the cage using the screws that held the dummy load.

STEP 6

Replace the left cage; connect the power supply plug (P10) to the fixed disk. Hold the cage in place. Put the drive's ground wire above the rear hole on the cage bracket. Install screws in the cage bracket.

STEP 7

Replace the system unit cover and reconnect all computer components.

STEP 8

Run ASTSETUP to add the new drive to your configuration.

B.3.2 Formatting and Partitioning a Fixed Disk

If you installed a fixed disk drive, you may also need to format and partition the disk before you can use it.

STEP 1

If you have an AST fixed disk and have not been instructed to reformat your drive. Go to Step 4.

If you are installing a non-AST fixed disk, create a file called FMT.DLS. An FMT.DLS file contains a list of defective locations (which occur in any magnetic media) on the fixed disk. These locations are determined by the manufacturer at the factory. The FMT.DLS file tells the computer where the defective areas are, so data will not be written to or read from those locations. Because a defect list is unique to each fixed disk, FMT.DLS files are not interchangeable. The defects are usually listed on a label or computer printout supplied with the disk (Figure B-17).

MEDIA DEFECT TABLE														
Hd	Cyl	BFIND	Hd	Cyl	BFIND	Hd	Cyl	BFIND	Hd	Cyl	BFIND	Hd	Cyl	BFIND
0	112	10041	1	152	2349	2	97	2020	2	883	8706	2	909	5026
2	955	1745	2	964	5719	2	974	2692	2	1006	9271	2	1015	8285
2	1015	8527	2	1021	9152	3	884	9519	4	105	5430	4	245	2757
4	895	6593	4	972	78	5	541	6798	5	653	8519	5	900	8293
6	196	6092	6	871	8696	6	926	2699	6	1001	5847	7	238	2760
7	888	6287	7	899	8620									

A130-31

Figure B-17. Fixed Disk Defect List (Example).

Use any text editor (MS-DOS EDLIN, WordStar® nondocument mode, or the MS-DOS command COPY CON) to open an FMT.DLS file and enter the defect list information. Enter each defective area on a separate line in the order shown below:

Cylinder	Head	Byte(BFIND)
0112	00	10041
0955	02	01745
1015	02	08527

Enter the information in the FMT.DLS file in decimal (*not* in hexadecimal). Add leading zeros to the numbers to make the columns easy to read.

STEP 2

Copy the FMT.DLS file to your Premium/386C Utilities working disk.

STEP 3

Perform a physical (low-level) format on the fixed disk. Boot your system using the Premium/386C Utilities diskette with the FMT.DLS file copied on it. From the Fixed Disk Options submenu, select the "Perform low level format" option to perform a low-level format on the fixed disk you have just installed. (See your *AST Premium Utility Software User's Manual* for detailed format procedures.)

STEP 4

Partition the disk and reboot. Select the "Partition fixed disk" option from the Fixed Disk Options submenu, or run the MS-DOS command FDISK to create partitions on your fixed disk. (See your MS-DOS Manual for more information on FDISK.) FDISK partitions the drive for use with MS-DOS. After creating the partitions, make sure to activate one using the "Change Active Partition" option on the FDISK Main menu.

With an MS-DOS disk in drive A, reboot the computer.

If you cannot run FDISK, you may need to perform a low-level format on the disk as described in Steps 1 through 3.

STEP 5

Perform a logical format: Use the format utility included with the operating system you will be using to perform a logical format. If you are using MS-DOS, select the "Install MS-DOS" option from the Fixed Disk Option submenu, or use the FORMAT command to format each partition. If you use FORMAT, make sure to use the /S switch on the active partition so you can boot from your fixed disk.

For a more detailed description of MS-DOS command FORMAT, see your MS-DOS manual.

B.3.3 Installing a Third Floppy Device

Your Premium/386C can use up to three floppy devices. A third floppy device can be a tape backup system, a 720-KB or 1.44-MB floppy drive, or a 360-KB or 1.2-MB floppy drive.

Hardware Installation

To configure and install a third floppy device:

- Configure the drive for drive select 1 (DS1), with the terminating resistor installed.
- Attach the data cable between the third floppy device and connector P4 on the system board (Figure B-9).
- Attach a power cable to the floppy device.
- Attach a grounding wire (from the side of the right cage) to the floppy device.

For more detailed hardware installation information see Section B.3.1.

Software Installation

After cabling the device, you must install the ASTDSK.DRV and DRIVER.SYS device drivers on your boot disk. ASTDSK.DRV is on your Premium/386C Utilities disk in the \ASTUTIL subdirectory. DRIVER.SYS is on your AST MS-DOS disk.

To install these drivers on your boot disk, add the following statements to your CONFIG.SYS file. (These statements assume you have created a subdirectory called DOS that contains the files provided on your MS-DOS disks.)

For a 360-KB drive:

```
DEVICE=C:\DOS\ASTDSK.DRV 0  
DEVICE=C:\DOS\DRIVER.SYS /D:2 /F:0
```

For a 1.2-MB drive:

```
DEVICE=C:\DOS\ASTDSK.DRV 1  
DEVICE=C:\DOS\DRIVER.SYS /D:2 /F:1 /S:15
```

For a 720-KB drive:

```
DEVICE=C:\DOS\ASTDSK.DRV 2  
DEVICE=C:\DOS\DRIVER.SYS /D:2 /F:2
```

For a 1.44-MB drive:

```
DEVICE=C:\DOS\ASTDSK.DRV 3  
DEVICE=C:\DRIVER.SYS /D:2 /F:7 /S:18
```

NOTE

The DRIVER.SYS statement varies according to the type of device you are installing. If you are installing a device not discussed in this section, look for the DRIVER.SYS command in the CONFIG.SYS section of your MS-DOS manual.

As your computer boots, the logical drive letter assigned to the third floppy device displays on the screen.

You *do not* need to run ASTSETUP to use a third floppy device.

AST PREMIUM/386C MEMORY BOARD C

Appendix C provides basic information about your AST Premium/386C memory board and shows you how to add memory to the board.

C.1 Premium/386C Memory Board

The Premium/386C memory board is seated inside the Premium/386C system in slot 1 (the slot furthest away from the drives). The board has a Eurocard connector, and slot 1 is specifically designed for its 32-bit data transfer.

Your factory-installed cache memory board has either 1 or 2 MB of memory built-in with *single inline memory modules* (SIMMs), which are small circuit boards fitted with memory chips. (The amount of memory on the board is determined by your system model.) The first MB of memory is allocated as follows:

- 640 KB used for conventional memory
- 128 KB reserved for Shadow RAM
- 256 KB reserved for future use

The board can hold up to 16 MB of memory. The memory board also contains 64 KB of high-speed static RAM and cache memory logic. Memory caching is accomplished by placing frequently accessed memory addresses, and their corresponding data, into the memory cache. When the CPU attempts to access an address in main memory, it searches the cache first. If the address is found, the corresponding data is sent to the CPU at the speed of the cache, avoiding the longer access time to main memory.

Figure C-1 shows the Premium/386C memory board.

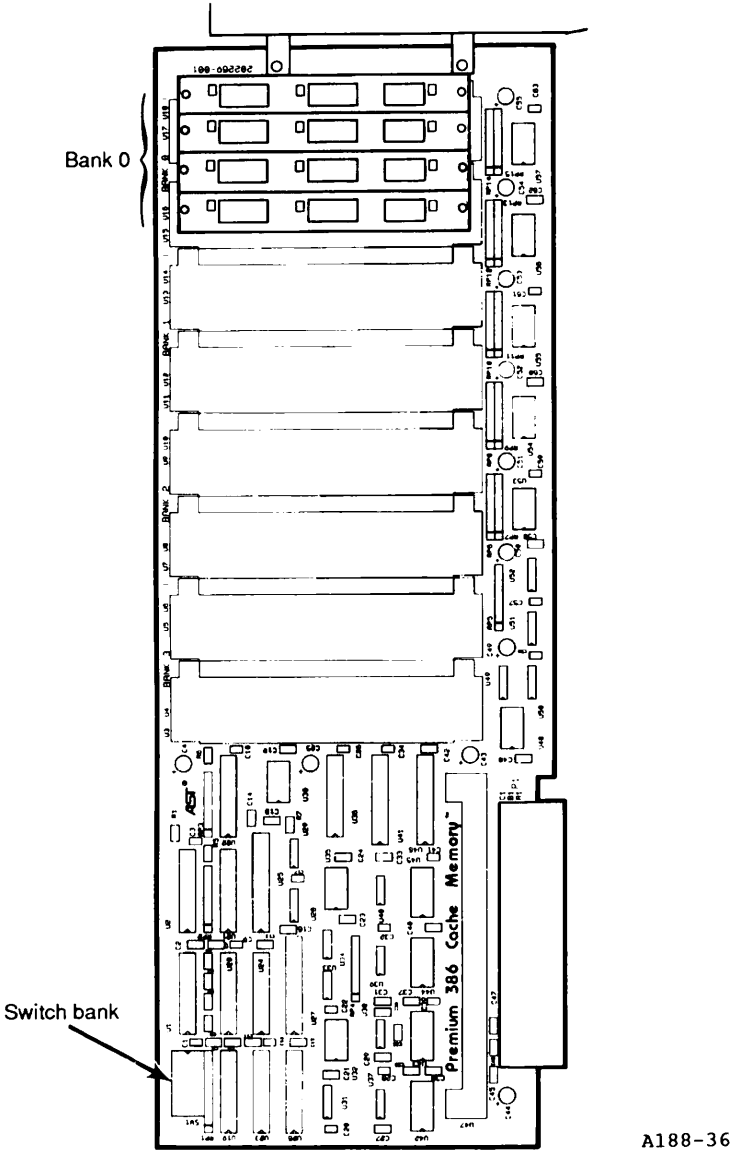


Figure C-1. Premium/386C Memory Board.

C.2 Adding Memory

Complete the following steps to add memory to the memory board.

STEP 1

Shut off the power to the computer and any peripherals. Remove the AST Premium/386C cover. Take out the memory board. (The memory board is located in slot 1, the slot furthest away from the drives.)

STEP 2

Follow the instructions in Section C.2.1 to add SIMMs to the memory board.

STEP 3

Follow the instructions in Section C.2.2 to set the memory board switch bank for the new memory configuration.

STEP 4

Plug the memory board into slot 1 of your computer.

STEP 5

Run ASTSETUP. Enter the amount of memory added in the Extended Memory field. See Section 3 for detailed information on ASTSETUP.

C.2.1 Installing SIMMs

The memory board has four sets of SIMM sockets called *banks*. Each bank contains sockets for four SIMMs, which can be either 256-KB or 1-MB SIMMs. Each bank can hold either 1 or 4 MB of memory, depending on the type of SIMM used. The maximum amount of memory the board can hold is 16 MB.

AST Premium/386C SIMMs must be added in banks, four modules at a time. SIMMs are available from your authorized AST reseller:

- Four 256-KB SIMMs, AST part number 500510-003
- Four, 1-MB SIMMs, AST part number 500510-004

CAUTION

Before handling SIMMs, discharge any static electricity by touching a grounded surface, such as a metal portion of the Premium/386C chassis.

Follow these rules when installing SIMMs:

- Fill the banks consecutively starting with bank 0. For example, install SIMMs on bank 0, then fill bank 1. You cannot skip a bank (fill bank 0 and then fill bank 2).
- SIMMs must be added in sets of four. A bank must be completely filled either to 1 MB using four 256-KB SIMMs, or to 4 MB using four 1-MB SIMMs.
- Do *not* mix SIMMs within a bank. For example, do not put a 1-MB SIMM in one socket and 256-KB SIMMs in the others.

- If you use 1-MB SIMMs in a bank, you must fill all subsequent banks with 1-MB SIMMs. (If you have both 256-KB and 1-MB SIMMs, install the 256-KB SIMMs in the first banks. For example, fill banks 0 and 1 with 256-KB SIMMs and bank 2 with 1-MB SIMMs.)
- Check Table C-1 to make sure you are installing a valid combination of SIMMs.

Table C-1. SIMM Installation by Bank.

Total Banks	Bank 0	Bank 1	Bank 2	Bank 3	Total Memory
1	256 KB	None	None	None	1 MB
	1 MB	None	None	None	4 MB
2	256 KB	256 KB	None	None	2 MB
	256 KB	1 MB	None	None	5 MB
	1 MB	1 MB	None	None	8 MB
3	256 KB	256 KB	256 KB	None	3 MB
	256 KB	256 KB	1 MB	None	6 MB
	256 KB	1 MB	1 MB	None	9 MB
	1 MB	1 MB	1 MB	None	12 MB
4	256 KB	256 KB	256 KB	256 KB	4 MB
	256 KB	256 KB	256 KB	1 MB	7 MB
	256 KB	256 KB	1 MB	1 MB	10 MB
	256 KB	1 MB	1 MB	1 MB	13 MB
	1 MB	1 MB	1 MB	1 MB	16 MB

For example, to install 6 MB of memory, check Table C-1. You would install 256-KB SIMMs in banks 0 and 1, providing 2 MB of memory. For the remaining 4 MB you would install 1-MB SIMMs in bank 2, bringing the total memory to 6 MB.

To install a SIMM, slide the SIMM's edge connector into the socket. The component side must face you (Figure C-2). Carefully push the SIMM into the socket until it is fully seated. (It is easiest to seat the right half of the SIMM in first and then seat the left half.) Push the SIMM back until it snaps into place. Be sure the retaining clips on the side snap back into place.

CAUTION

Make sure the SIMM is securely in the socket by checking that the plastic retaining clip holding the SIMM is at a 90° angle. Improper installation of a SIMM can damage the memory board.

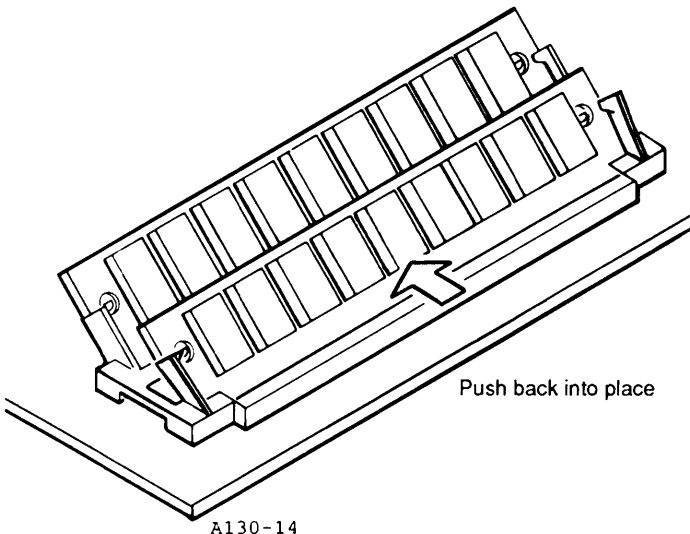


Figure C-2. Installing a SIMM.

To remove a SIMM, carefully pull the plastic retaining clips apart. From the back, push the SIMM slightly forward. Pull the SIMM out (Figure C-3).

NOTE

Do not pull hard on the clips or you will break them.

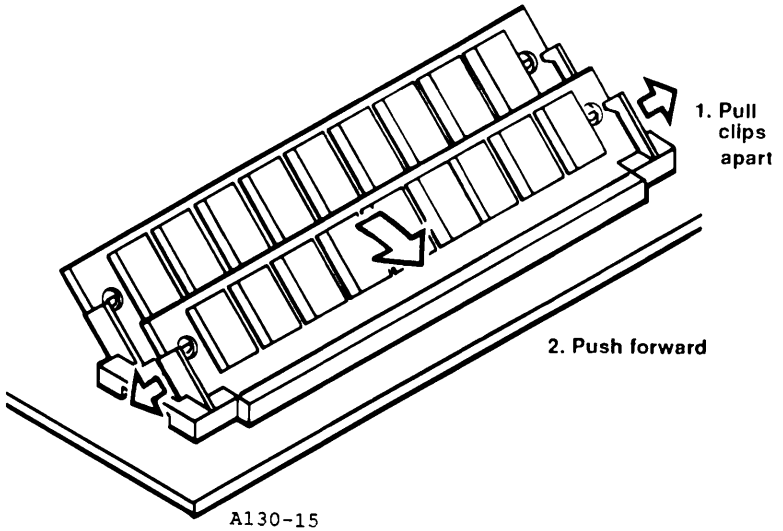


Figure C-3. Removing a SIMM.

C.2.2 Setting the Memory Board Switch Bank

The switch bank on the memory board designates the amount of memory the board contains. Memory cannot be recognized unless the switch is properly set.

Bank 0 is represented by a single switch, number 8. The remaining three banks are represented by pairs of switches (Figure C-4).

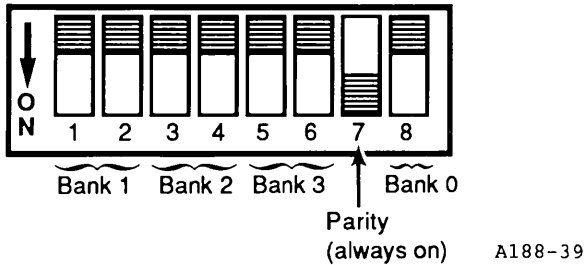


Figure C-4. Setting the Memory Board Switch Bank.

The switches for a bank designate the amount of memory. For instance, the amount of memory in bank 0 is designated by switch 8. Set the switch to the on position when bank 0 is filled with 1-MB SIMMs. When bank 0 is filled with 256-KB SIMMs, the switch is set to off.

For banks 1, 2, and 3, pairs of switches designate the amount of memory installed. For instance, switches 1 and 2 designate the memory for bank 1.

Switch 7 enables or disables parity checking. This switch should always be set to on to ensure that memory is constantly checked for reliability.

Figure C-5 illustrates how the switch settings designate memory:

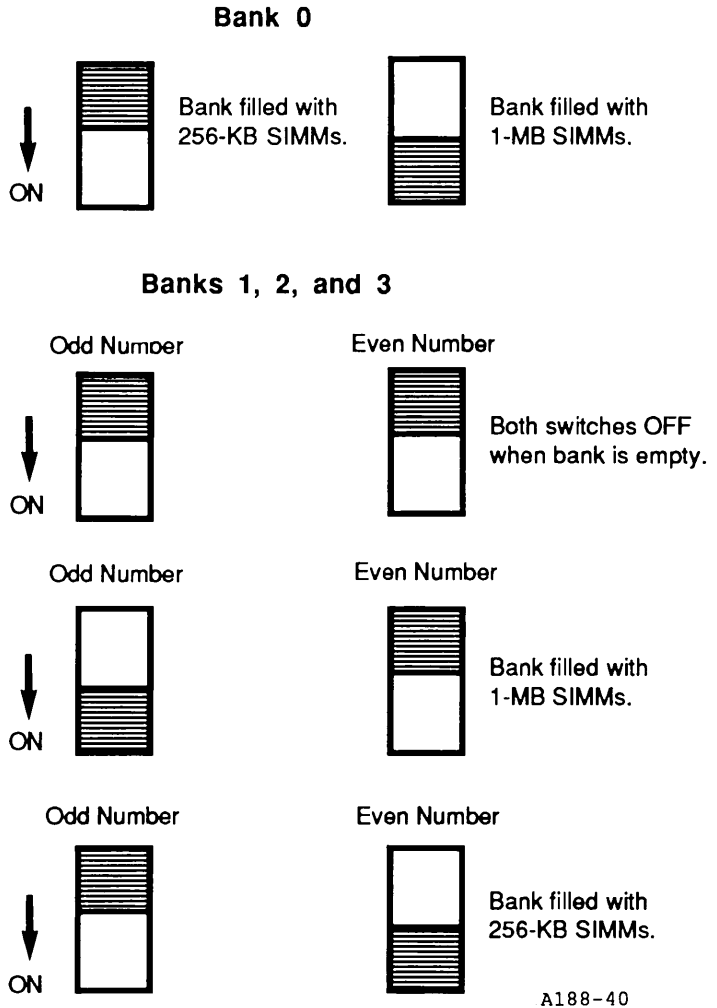


Figure C-5. Setting the Memory Board Switches for SIMMs Installed.

Refer to Tables C-2 and C-3 for complete switch bank configurations.

**Table C-2. Memory Board Switch Settings - With 256-KB
SIMMs In Bank 0.**

Total Memory	Switch							
	1	2	3	4	5	6	7	8
1 MB	off	off	off	off	off	off	on	off
2 MB	off	on	off	off	off	off	on	off
3 MB	off	on	off	on	off	off	on	off
4 MB	off	on	off	on	off	on	on	off
5 MB	on	off	off	off	off	off	on	off
6 MB	off	on	on	off	off	off	on	off
7 MB	off	on	off	on	on	off	on	off
9 MB	on	off	on	off	off	off	on	off
10 MB	off	on	on	off	on	off	on	off
13 MB	on	off	on	off	on	off	on	off

**Table C-3. Memory Board Switch Settings - With 1-MB
SIMMs In Bank 0.**

Total Memory	Switch							
	1	2	3	4	5	6	7	8
4 MB	off	off	off	off	off	off	on	on
8 MB	on	off	off	off	off	off	on	on
12 MB	on	off	on	off	off	off	on	on
16 MB	on	off	on	off	on	off	on	off

The Premium/386C's three SMARTslots are specially enhanced expansion slots on your system board. SMARTslot Architecture consists of an arbitrated, multimaster bus that is PC AT-compatible. Appendix D defines the bus and explains how SMARTslot Architecture can enhance your computer's performance.

D.1 Defining the Bus

The bus is a communication channel carrying signals from any device used by the system to any other device. For example, data being transferred to and from a fixed disk, modem, or graphic controller travels to and from its destination on the bus.

Before SMARTslot Architecture or IBM's Micro Channel™, the central processing unit (CPU) was the only "traffic cop" coordinating all activity across the bus. In a single-processor environment, the CPU can usually handle bus traffic effectively. However, in a multiprocessor environment with intelligent peripheral controllers, where there are numerous requests for memory and bus access, a CPU is overcrowded with bus traffic and its efficiency declines.

D.2 Using SMARTslot

SMARTslot Architecture allows the microprocessor to share the job of directing bus traffic with other coprocessors called *masters*. Masters, located on option boards, need the extended architecture (extra pins) SMARTslot Architecture provides to be utilized.

As an example, in multiuser environments with frequent disk access (such as complex databases and computer-aided design applications), intelligent peripheral controllers using the SMARTslot multimaster design can significantly increase data throughput and system performance.

You can put any type of PC XT or AT-compatible board in a SMARTslot. However, to maximize your computer's performance, reserve SMARTslot Architecture for use by boards with a master. Locations of SMARTslot Architecture are shown in Figure D-1.

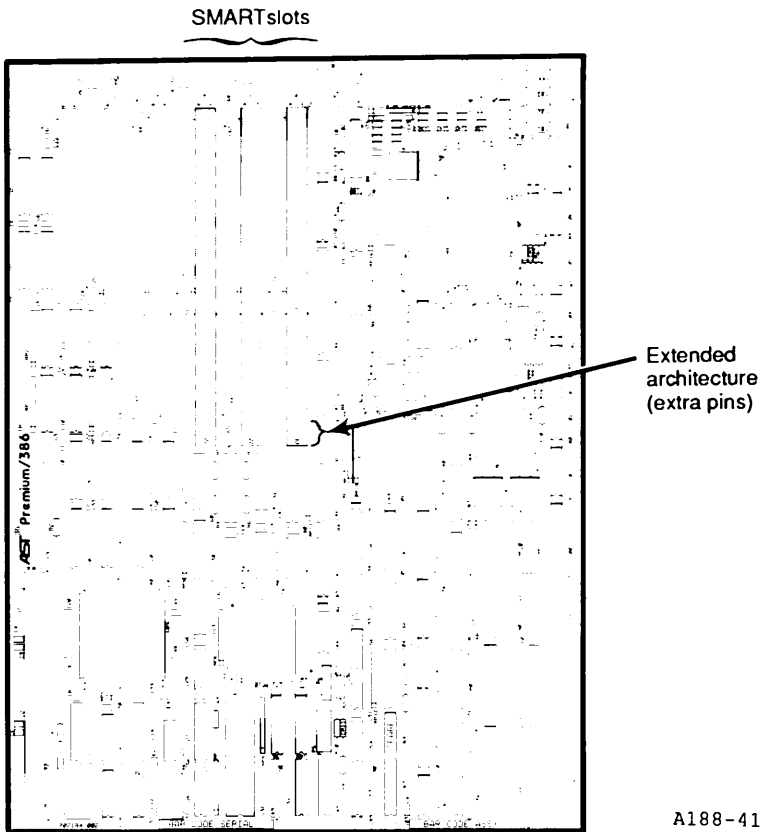


Figure D-1. Locating SMARTslot Architecture.

The Premium/386C system includes two serial ports (COM1 and COM2) and one parallel port (LPT1). These ports are built into the system board, so they do not take up an expansion slot in the computer.

The serial ports can connect your computer to a serial printer, modem, or other device that uses an RS-232C interface. The parallel port can connect the Premium/386C to a parallel printer.

This appendix tells you how to change the configuration of the ports and provides reference information.

E.1 Serial Ports

Premium/386C has two serial ports. The ports conform to the Electronic Industries Association (EIA) RS-232C communication standard.

Premium/386C serial ports are configured as a Data Terminal Equipment (DTE) device. Each serial connector is a DB25P connector (25-pin male).

E.1.1 Changing the Serial Port Configuration

To disable or enable either of the built-in ports, run ASTSETUP. (Detailed instructions on ASTSETUP are provided in Section 3.) You may need to disable a built-in serial port if a conflict occurs between the built-in port and an added serial port.

If both serial ports are enabled, Serial Port 1 (the lower port) is COM1 and Serial Port 2 (the higher port) is COM2 as shown in Figure E-1.

If only one serial port is enabled, it must be Serial Port 1, and the device name can be either COM1 or COM2, depending on the other serial ports installed in your system.

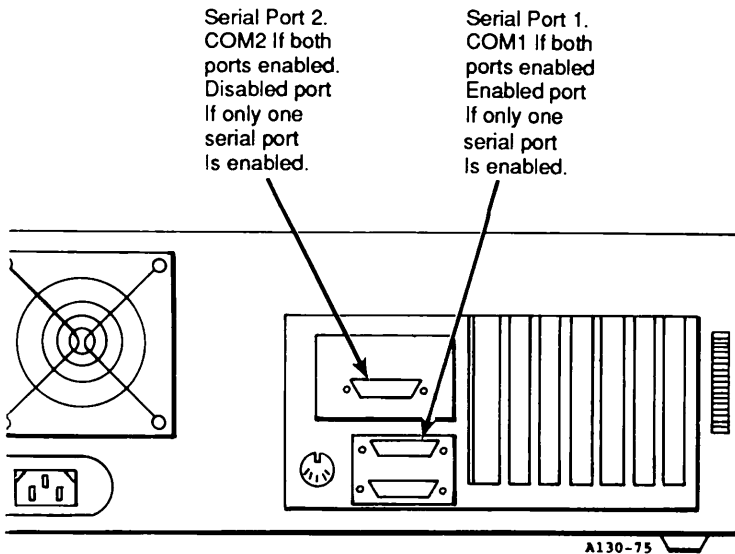


Figure E-1. Locating the Enabled Serial Ports.

E.1.2 Cabling Your Serial Ports

You can usually connect your serial device to the Premium/386C serial port with the cable supplied with that device. The serial ports are labeled on the Premium/386C back panel.

In some cases, your cable instructions will specify how your remote device uses RS-232C line signals and which pin numbers supply which signals. With this information, plus the general information in Appendix F, you can construct an interface cable yourself.

NOTE

Serial devices use RS-232C signals in different ways. AST Research cannot tell you how to connect a particular device to your serial port. Refer to the manufacturer's instructions that came with that device.

E.1.3 Programming the Serial Ports

Premium/386C serial ports are completely under software control, and must be initialized for correct baud rate, parity, number of data bits, and number of stop bits before they can be used. You (via a MODE command in your AUTOEXEC.BAT file, for example) or your application software must initialize the serial ports each time you turn on the computer.

NOTE

Using SuperSpool with your serial printer eliminates the need to use the MS-DOS MODE command.

Typically, the MS-DOS MODE command initializes the serial ports (refer to your MS-DOS manual for a detailed explanation of this command). A typical MODE command might look like this:

MODE COM1:1200,N,8,1,P<Enter>

The above command initializes serial port COM1 for 1200 baud, no parity, 8 data bits, and 1 stop bit. The P is optional and tells MS-DOS to continue retrying transmissions on timeouts. You can also use a similar command to establish communication parameters for serial port COM2.

Many application programs (such as word processors) automatically handle port initialization, making it unnecessary to use the MODE command. If you are unsure, it will not harm anything to use the MODE command.

If you are using the serial port to operate a serial printer, you may also need to redirect printer output from the parallel port, LPT1, to one of the serial ports, COM1 or COM2. This is because MS-DOS always assumes printer output goes to LPT1 unless told otherwise. You can use the MODE command to redirect printer output from LPT1 to COM1 or COM2. For example:

For printer output from LPT1 to COM1

MODE LPT1:=COM1:<Enter>

For printer output from LPT1 to COM2

MODE LPT1:=COM2:<Enter>

A redirection command, like the ones above, should follow the first MODE command that sets the baud rate, parity, and so forth. Again, your application program might handle this redirection automatically. If so, you need not issue a redirection command yourself.

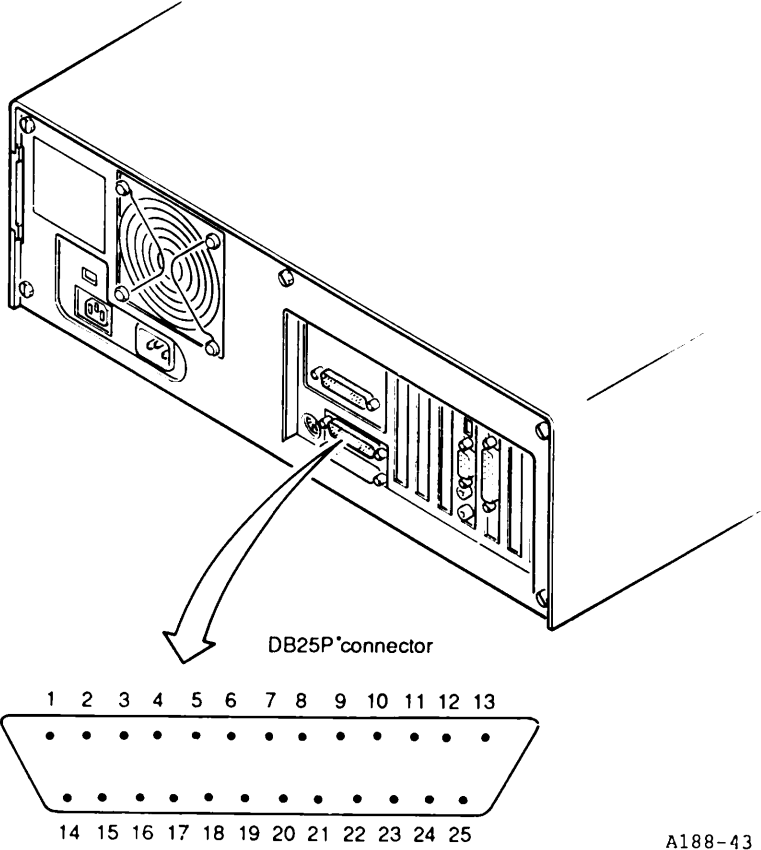
E.1.4 Serial Port I/O Addresses and Pinouts

Premium/386C serial ports use the system I/O addresses and interrupt request lines (IRQ) shown in Table E-1.

Table E-1. Serial Port I/O Addresses and IRQs.

Device Name	IRQ Line	I/O Addresses
COM1	IRQ4	03F8-03FFh
COM2	IRQ3	02F8-02FFh

Figure E-2 gives the pinout for the Premium/386C serial port.



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Figure E-2. Premium/386C Serial Port Pinout.

E.2 Parallel Port

Premium/386C has one built-in parallel port (LPT1). The port is completely compatible with the AT and uses the same DB25S (female 25-socket) connector as an IBM port.

To change the device name or disable the built-in parallel port, run ASTSETUP. (Detailed instruction on ASTSETUP is provided in Section 3.)

E.2.1 Configuring the Parallel Port

You can install a maximum of three parallel ports in the Premium/386C system. The device names for the parallel ports are LPT1, LPT2, and LPT3. When looking for parallel ports, the computer polls these hexadecimal I/O addresses in the following order:

1. 0378-037Ah (LPT1): Unless you specifically change the configuration of the Premium/386C parallel port, it will use these I/O addresses. If there is a port configured to 03BC-03BEh, this port will be LPT2.
2. 0278-027Ah (LPT2): The Premium/386C parallel port will occupy these addresses if you change the port's configuration to do so. This port will be assigned to LPT3 if the devices using the 03BC-03BEh and 0378-037Ah addresses are already installed in your computer.

The computer assigns the device name LPT1 to the first parallel port it finds (in the order of polling), LPT2 to the second parallel port, and LPT3 to the third parallel port (if any). For example, if the computer finds parallel ports at the first and third possible I/O address ranges, it will assign the device names LPT1 and LPT2 to those ports. If there are parallel ports installed at the second and third possible I/O addresses, they will be called LPT1 and LPT2, respectively.

NOTE

If there is an LPT3 in your system, an IRQ for that port is not supported in the Premium/386C system.

Unless your Premium/386C system includes a parallel port occupying I/O addresses 03BE-03BCh, printer port LPT3 is not supported.

E.2.2 Installing Multiple Parallel Ports

If your Premium/386C will include another board with a parallel port that occupies the same I/O address range as the Premium/386C parallel port, you must change one of the devices to avoid conflicts between the two ports. To change the device name or disable the built-in parallel port, run ASTSETUP.

E.2.3 Display Adapters with Built-in Parallel Ports

The built-in parallel port on certain display adapter boards (such as the IBM Monochrome display/printer adapter) always responds as LPT1 (using I/O addresses 03BC-03BEh) and cannot be changed.

When such a board is installed in your computer, the Premium/386C parallel port automatically responds as LPT2 in its default configuration. You do *not* need to reconfigure the Premium/386C to respond as LPT2.

E.2.4 Programming the Parallel Port

Under MS-DOS, the Premium/386C always sends printer output to parallel port LPT1 unless specifically told otherwise.

E.2.5 Parallel Port I/O Addresses and Pinout

The Premium/386C parallel port uses the I/O addresses listed in Table E-2.

Table E-2. Parallel Port I/O Addresses.

Port Configuration	I/O Addresses
LPT1 or LPT2	0378-037Ah
LPT2 or LPT3	0278-027Ah

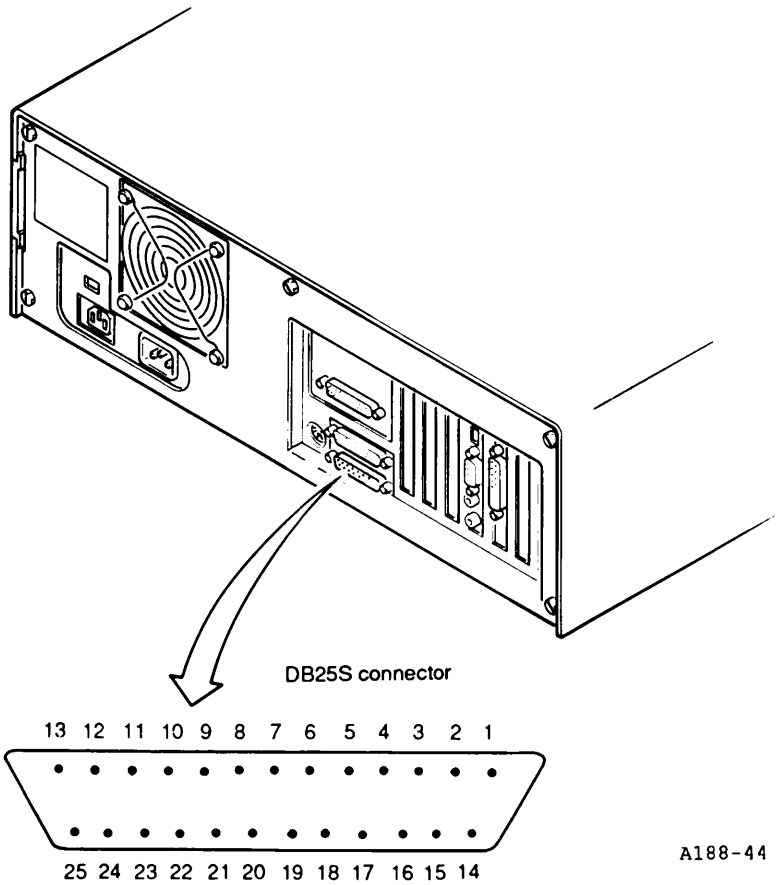
NOTE

When you use a display adapter with a built-in parallel port fixed as LPT1, MS-DOS sees the Premium/386C parallel port configured for LPT1 as LPT2.

You can use the standard IBM Parallel Printer Cable to connect the Premium/386C to an IBM or IBM-compatible printer. You can also use the information in Table E-3 and Figure E-3 to help build a cable for your parallel printer.

Table E-3. Parallel Port Pinouts.

Line Name	DB25S Output	Centronics Interface
-STROBE	1	1
D0	2	2
D1	3	3
D2	4	4
D3	5	5
D4	6	6
D5	7	7
D6	8	8
D7	9	9
-ACK	10	10
BUSY	11	11
PE	12	12
SLCT	13	13
-AUTOFD	14	14
-ERROR	15	32
-INIT	16	31
-SLCT IN	17	36
GROUND	18-25	16, 19-30,33
- Indicates lines that are functionally active when low.		



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Figure E-3. Premium/386C Parallel Port Pinout.

E.2.6 Interrupt-Driven Parallel Printer Software

Unless you specifically change the configuration of the computer's parallel port, it responds as LPT1 (using IRQ7). (You can also configure the port to respond as LPT2 using IRQ5.)

For interrupt-driven parallel printer software to operate correctly, an IRQ line must be enabled (via ASTSETUP). It will not harm anything for an IRQ to be enabled even if you are not running interrupt-driven software for your parallel printer, as long as no other device in your computer uses this interrupt.

Your Premium/386C computer comes with at least 1 MB of memory and supports up to 16 MB (Figure F-1). The first 1 MB of memory is divided into *conventional memory* and *reserved memory*. *Conventional memory* is managed by MS-DOS and used by your application software.

Reserved memory is not normally accessible by DOS applications. It is used for AST enhancements such as Shadow RAM and ASTEMM.

Shadow RAM is an area of fast 32-bit RAM that is reserved for a copy of ROM BIOS. The area is write protected so that the BIOS code cannot be altered while running. When Shadow RAM is enabled, the system BIOS is automatically copied into the upper 64 KB of the Shadow RAM each time you boot. Other kinds of BIOS, such as those on network cards that reside at the address E000h and are not larger than 64 KB, will also be copied into Shadow RAM.

Shadow RAM uses 128 KB of reserved memory. Whether or not the Shadow RAM feature is enabled is determined in ASTSETUP. The default, factory configuration has Shadow RAM enabled. Even if Shadow RAM is not enabled, this 128-KB area of memory remains inaccessible to other programs.

ASTEMM is the Premium/386C expanded memory manager; it uses extended memory to emulate expanded memory. ASTEMM has two uses for its portion of reserved memory. First, ASTEMM uses between 60 KB and 80 KB of reserved memory for its own program code. Second, ASTEMM makes reserved memory available for use as expanded memory. Expanded and extended memory can be used *only* by special software. For example, the ASTcache™ fixed-disk cache program and Lotus® 1-2-3® Version 2.0 and above are capable of using expanded memory.

On a fully populated board, if conventional memory equals 640 KB, reserved memory equals 384 KB. If conventional memory is changed to 512 KB, reserved memory is reduced to 128 KB and the remaining memory up to 1 MB becomes extended memory.

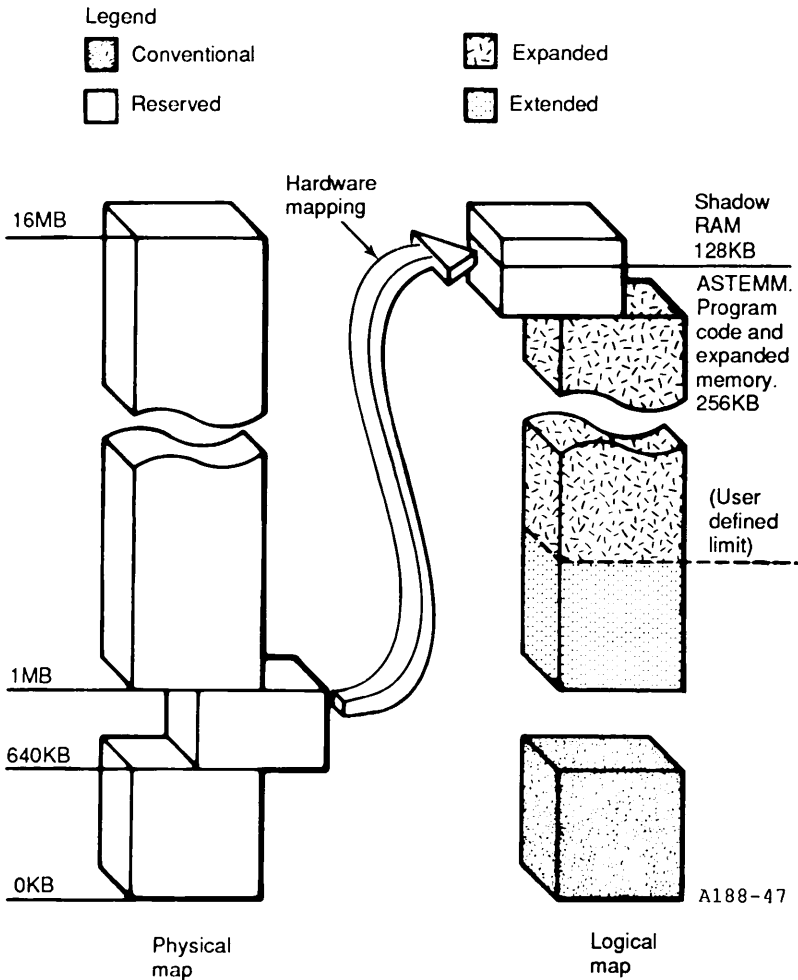


Figure F-1. Premium/386C Memory Map.

Install ASTEMM in your system by adding a DEVICE statement to your CONFIG.SYS file. The default installation of ASTEMM uses all available reserved and extended memory as expanded memory (Table F-1).

**Table F-1. Memory Allocation for
DEVICE=drive:\path\ASTEMM.SYS.**

1-MB System		2-MB System
Conventional memory	640	640
Reserved memory		
Shadow RAM	128	128
ASTEMM program code	64	60
Used as expanded memory	192	196
Extended memory		
Used as expanded memory	0	1020
Left as extended memory ¹	0	4
¹ Since the total amount of expanded memory must be a multiple of 16, 4 KB are left over as extended memory in the 2-MB system.		

If you do not want to use all available memory as expanded, you can add an option (EMS=) to your DEVICE statement. However, the maximum amount of expanded memory that you can specify with the EMS option is the total amount of extended memory in your system (Table F-2). Extended memory does *not* include reserved memory.

**Table F-2. Memory Allocation for
DEVICE=drive:\path\ASTEMM.SYS EMS=1024.**

	2-MB System
Conventional memory	640
Reserved memory	
Shadow RAM	128
ASTEMM program code	60
Used as expanded memory	196
Extended memory ¹	
Used as expanded	828
Left as extended	196
¹ The EMS option in the DEVICE statement requests 1024 KB of expanded memory. ASTEMM uses 196 KB of available reserved memory and 828 KB from extended memory to fill the requirement. 196 KB are left as extended memory.	

Look in your *AST Premium Utility Software User's Manual* for ASTEMM installation instructions.

GLOSSARY

Base I/O address

The address the computer uses to communicate with a device attached to it. Unless otherwise specified, each device installed in or attached to the computer uses its own unique I/O address.

Base memory

Another name for *conventional memory*. Computer memory between 0 and 640 KB. MD-DOS can directly access all conventional memory. Your computer does not need any special software to use base memory.

Boot up

To start your computer. For a cold boot, turn your system off then on or press the RESET button on the front panel. For a warm boot, press <Ctrl>-<Alt>-<Del> while the computer is on.

Bus

A communication channel carrying signals from any device used by the system to another device. For example, data being transferred to and from a fixed disk travels on the bus.

Byte

The basic unit of measure for computer memory. A character -- such as a letter of the alphabet -- uses one byte of memory. Computer memory is often measured in *kilobytes* (approximately one thousand bytes) or *megabytes* (about one million bytes).

Each byte is made up of eight *bits*. For more information on bytes and bits, see an introductory book on computers.

Cache Memory

Cache is very fast, zero-wait-state memory located between the central processing unit (CPU) and main memory. Cache reduces the average time required for the CPU to get the data it needs from the main memory by storing frequently accessed data in the cache.

CONFIG.SYS file

A file on the boot disk that configures MS-DOS. The commands in a CONFIG.SYS file (if one exists on your boot disk) are carried out before those in an AUTOEXEC.BAT file. Usually, the commands load device drivers into your system.

A CONFIG.SYS file must be present on your boot disk if you want to use the bus master on the AST Advanced Disk Controller or create a FASTdisk (AST's RAM fixed disk).

Conventional memory

Also called *base memory*. Computer memory between 0 and 640 KB. MS-DOS can directly access all conventional memory. Your computer does not need any special software to use conventional memory.

Default

For hardware, the way a switch or jumper is set at the factory. For software, the value of a parameter unless specified otherwise.

Disk

The device used by the computer to record and play back information. "Disk" can refer to floppy diskettes, fixed disks, and RAM disks.

Disk Operating System (DOS)

MS-DOS is the most common operating system for the AST Premium/386, as well as the AST Premium/286.

An operating system supervises the computer's operation, including handling input/output (I/O). Application programs and users can request MS-DOS services. A user might request MS-DOS services to copy files or format a disk. An application program might use MS-DOS to obtain keyboard input, write data to a file, or write data to a screen.

Because different versions of MS-DOS request services differently, it is important to be sure that your application software is compatible with the version of MS-DOS you are using.

Display adapter

The part of the computer that runs the monitor.

Extended memory

Linear memory in the 1- to 16-MB address range. Extended memory exists in the AST Premium/386, the AST Premium/286, IBM PC AT, and compatible computers. Under MS-DOS, extended memory is usually used for RAM disks and print spoolers. The XENIX operating system can directly address extended memory.

Fixed disk

Also called "hard" or "Winchester" disks. Fixed disks are attached to the computer, and can be installed or removed. Data written to a fixed disk remains until it is overwritten or corrupted.

Floppy disk

Removable disks, also called "floppies" or "diskettes."

I/O

Input/output. Refers to peripheral devices (such as printers) that are addressed via an I/O address. (See *base I/O address*.)

Jumper, Jumper block

A jumper block is a set of bare (uninsulated) pins on a circuit board. A jumper is a wire (usually encased in plastic) that electrically connects wires on a jumper block.

Kilobyte (KB)

1024 bytes (see *byte*). An amount of memory such as "8 KB" is shorthand for 8192 bytes.

Linear memory

Any memory that can be addressed without memory paging. Linear memory includes both conventional and extended memory.

Master

Intelligent device capable of directing bus traffic. A master is included on AST's Advanced Disk Controller.

Megabyte (MB)

1024 kilobytes (see *kilobyte* and *byte*).

Multitasking

The ability to run two or more tasks at the same time.

Parity checking

A method of checking the accuracy of information stored in the computer's memory. This feature should not be disabled unless there is a special reason to do so.

Power-on self-test (POST)

A test performed by the computer whenever you turn on power. POST checks system integrity.

Random access memory (RAM)

The computer's system memory, including *conventional* and *extended memory*. You can write to and read from RAM.

RAM disk

A program that enables you to use part of the computer's memory as if it were a disk.

It is faster to read and write to RAM than to disk. Storing information on a RAM disk can speed up applications that use disk information frequently.

RAM disks are erased when the computer is turned off or rebooted. This means that you must save any data you want to keep on a floppy or fixed disk.

Read only memory (ROM)

Permanent computer memory dedicated to a particular function. For example, the instructions for starting the computer when you first turn on power are contained in ROM. You cannot write to ROM.

Single inline memory module (SIMM)

Circuit board with memory chips. SIMMs are used on the AST Premium/386 memory board.

SMARTslot Architecture

A uniquely designed expansion slot on your system board. SMARTslot architecture consists of an arbitrated, multimaster bus that is PC AT-compatible.

Starting memory address

To access memory, the computer must specify a particular location -- the memory address. The first memory addresses are assigned to system memory. System memory starts at 0 KB.

Starting addresses for devices added later depend on how much memory is already installed in the computer.

Volume

Also called "logical drive" or "logical volume." A volume appears to MS-DOS as a physically separate drive, even though several volumes may be part of only one larger physical drive. For example, one physical 40-MB fixed disk might consist of one 32-MB volume, and one 8-MB volume.

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NOTES

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